THE BUILDER

A RECORD OF ARCHITECTURE & CONSTRUCTION

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THE BUILDER

A RECORD OF ARCHITECTURE AND CONSTRUCTION.

WITH WHICH IS INCORPORATED THE "BRITISH ARCHITECT."

VOL. CXVIII.—No. 4013. JANUARY 2, 1920

A NEW YEAR'S WISH.

IT is of little use to wish a friend a Happy New Year without giving a passing thought to the blessings which are likely to secure his happiness. Foremost among these is health. Let us, therefore, in wishing England, and particularly the architectural and building world of England, a Happy New Year, give sympathetic consideration to England's health; and, in praying for this blessing, let us intelligently think what health in a mixed region of art and trade means. However greatly we may despise political economy—and it is often most rightly despised—there are certain clear facts about the balancing of values in labour against values in food which the daily marketings of life have made clear beyond dispute. The value of money is a shifting thing; how greatly it can shift has become painfully obvious during the years of war, and what we call "peace." With that shifting we have no need to deal at this moment of writing; but we do deal and must deal with the broad fact that, in a healthy labour market, the more a man does, provided that he does it properly, the more he should be paid. This proposition may be accompanied by another, that the *better* a man does a given piece of work the more he should be paid.

Now the professional classes—typified in our own little world chiefly by architects and surveyors—have long been well aware of the validity of the first of their propositions. On the second we sometimes have anxiety. We recognise the reasonableness of paying the expert at a higher rate than the beginner or the bungler; but continued familiarity with the injustice of a world in which men are sometimes acclaimed (and paid) as experts without really having greater skill than their juniors or supposed inferiors, sometimes makes us doubt whether it is possible to claim universality for a law which is so frequently deflected or broken. Still, speaking broadly, the professional classes do recognise, as a matter of conscience and as a rule of obligation, the two principles that more work and better work demand and receive more pay than little work and poor work.

Buildings are the products of two classes of men—the designing and controlling class and the operating class. No pleas of democracy or philanthropy are likely, under any claims of elementary justice or any calls for a return to the supposed spirit of the Middle Ages, to sweep away the main elements of this dual agency. It has seldom been suggested in the wildest flights of trade-unionism, or syndicalism, or Bolshevism that masons, carpenters, and plumbers would get on better without architects and surveyors. So long, then, as it remains convenient to all parties that buildings should be constructed by two classes, it is of interest to inquire in the cause of health how far those two classes are inspired by the same elementary considerations of balanced economics.

Before going further, let us remark that by classes we do not mean social classes. There is, of course, some practical convenience to the promoters of buildings in employing as architects men of comparative refinement and education, but there is obviously no reason against the workmen being of equal education and refinement; in fact, it will be all to the good if they are. But what we want to emphasise is the curious fact that the economic faith of these two classes of men working side by side in the production of buildings is not the same.

Nearly all the beginnings of the present chaos were begotten of sentiments in themselves excellent. The morally fine opinions that all men should have a living wage; that workmen and labourers should be able by combination to obtain from hard-hearted employers the justice which, as individuals, they were not strong enough to secure; and, finally, that "sweating" should be checked, all these opinions are based on the noblest sentiments of brotherhood and compassion. But the result of them has, unfortunately, been the gradual establishment of a principle which though recognised as an axiom is really a fallacy. That principle is nothing less than the promotion of time as a substitute for energy. Time is not energy. Time is worth nothing except what it contains, and the acceptance by a large part of our nation of the proposition that time is a commodity (in fact, the principal commodity) on which our money is to be spent is nothing less than the setting up of a standard of ruin. The remedy, the objectors say, is to be found in the judicious blending of *selection* with time payment. An employer, let us say, engages a hundred men; he pays them all alike and all by time, and if he finds that a certain percentage of the men are not worth the money, he can discharge them. That is true in theory, but how far is it true in fact? A mere hint will indicate what bearing the policy of "unemployment pay" has had on the economic principle involved.

The honest fact which we have to face is this—that a very grave injustice is daily being done to good, industrious and capable workmen in all trades. Industry and love of good work are human characteristics that die very hard. Thank God there are among the working men of our own acquaintance many craftsmen whose character draws them daily into honest, whole-hearted fulfilment of their tasks. These are the men to whom the gravest injury is done by the system under which they of necessity live. The battle-cry of the "welfare of all" has done injustice to the very army that raised the cry. If the spirit of *égalité* merely announced that every man who does his best is worth full and equal pay, we should be willing, in spite of the illogicality of the announcement, to accept the decree. *Fraternité* and *liberté* would join in and make the best of it. But the trouble is that, as all good workmen know, the level that earns this equal pay is not the highest. Equal pay for all who do their best would still be an injustice to those who could do better. The present level of energy on which the equal pay is squandered is a level the descent to which robs the good man of his own value. The time will come when the best of the best will no longer stand this theft of what is due to them. Few seem to realise the trend of the present labour policy. The perpetual raising of the pay of labour, excellent in itself, is by virtue of its misapplication having strange results. Every general rise of this pay increases almost *pari passu* the cost of the commodities which the worker himself requires. The very fact that his money is come by more easily diminishes his productive power, which fact again accelerates the rise in costs. Further, as a by-product, the whole process lowers the relative wealth of the middle-classes, who, when all is said and done, form a large proportion of the working man's employers. So that the more the worker gets and the more easily he gets it, the higher becomes the cost of the things he wants to buy and the fewer become his possible employers.

Can no one see, in the midst of this confusion, that what is wanted is an endowment not of Time but of Energy? Our false position, drug-fed by the Government's false medicine, can never heal the distress of human nature, which, after all, is a force to be reckoned with. Never till skill and industry are rewarded, never till honest rivalry returns, never till reasonable competition urges the worker, never till indolence meets again its normal chastisement can the English body politic have the functions and the joy of health.

But enough. A Happy New Year to England and to England's builders. May the year see some beginnings, however small, of the recovery of health. May it witness some realisation, however dim, of the truths that work can only very vaguely be measured by time, that idleness in the world even of Christian economics is worth nothing, that good work is worth more than bad, that, strange as the doctrine may sound, best work is worth more than second-best and finally, though one hardly dares to say such a thing, that no country is healthy in which its workers (who are the producers of their own wealth) are not working their very best. There is a body of men in England who work still on the old principle—value for money. We mean the whole professional body. Is it too much to ask that the world of labour, full as it of strong, energetic, capable men, who love work for work's sake and who are sportsmen enough to like to "see the best man win," should think over this matter and reflect whether some kind of freedom which would give a man a chance of coming into his own through reasonable rivalry, would not be preferable to the present diseased chaos of subsidised ruin?

NOTES.

Greek Afternoons at the British Museum.

WE are glad to call attention to the series of articles which Professor Lethaby will be contributing to our pages during the coming year on "Greek Afternoons at the British Museum," the first of which we give this week. The special study Professor Lethaby has devoted to Greek art gives more than ordinary interest to his observations on the subject. His concluding remarks this week on Stonehenge are characteristically suggestive and provocative of thought.

"Tips" for Builders.

WE wonder how many of the "tips to builders" so readily offered are of any real value. We noted three or four the other day which convey nothing new—only things that are likely to prove too expensive to accept. These included central heating, hard-wood floors, big porches, and wood-panelled walls. It sounds nice enough, but what architect or builder of any standing who can afford these things fails to adopt them? A tipster of these benefits writes as though we hadn't been adopting solid wood floors whenever we could for many years past. Whilst we are about it we might, perhaps, as well adopt hard-wood floors, wood-panelled walls and big porches for some of our housing schemes! There is one thing, however, which ought to be practicable, and that is the brick oven; this would not be an insuperable cost—one to, say, every twelve or twenty cottages. We always remember with pleasure the recurrence of baking-day at a brick oven belonging to a country house in Kent; this is something which need not be denied to folk who live in cottages.

Citizenship and Art.

A TIMELY call for the exercise of the rights and duties of an ideal citizenship has been made by Mr. Halsey Ricardo on behalf of the Civic Arts Association, which we hope will meet with some response from all classes, but especially from those who really have the time and ability to do some service to their fellows. But what we chiefly hope is that the Press generally may note and act upon Mr. Ricardo's appeal for a better and more constant appreciation in the periodical Press of the claims which architecture and all the arts should have on the regard of the public. We are fully alive to the discriminating and timely articles which at times do appear in the daily Press as regards architectural subjects, but they might be extended with advantage to us all, so that in time the public will come to think of art in its widest meaning and associate it less with the mere painting of pictures. We once heard a distinguished artist express the wish that all old buildings and pictures and furniture could be hidden away for a hundred years, so that modern art might have a chance, and we find some echo of this desire in Mr. Ricardo's words, which we here quote:—"It is a matter of melancholy surprise that one gets so little help and guidance in this direction from the Press. No voice is lifted up against the preposterous and depressing prices that works of art—and especially furniture—are realising in the sale rooms at the present day. It requires small imagination to conceive how deadly this traffic must be to the heart of a craftsman anxious to add to the world's store of living art."

The Termination of the War.

THE Prime Minister, on November 27, answered a question which we raised in a note in these columns on September 26. We asked whether under the Termination of the Present War Act the Government would, by Order in Council, declare the war to be determined as soon as the principal Powers have ratified the peace treaties, or whether it would wait until the last power had come into line. In answer to a question in the House, the Prime Minister has stated that the legal termination of the war will not take place until the ratification of the last of the treaties with countries which have been at war with his Majesty and his Allies. In our note we pointed out the importance of this point, both as regards the emergency statutes and their effect upon contracts. In many of these statutes there is a provision that they shall remain in force for a further period of six months, after the war has been declared to have terminated, and these statutes continue war burdens and create uncertainty in peace relations. If it is the intention of the Government that the war shall not be declared at an end until the last treaty has been signed, we respectfully suggest that these statutes should be repealed by Act of Parliament, and that war conditions should not be continued by them until they expire as originally intended, *i.e.*, six months after the termination of the present war.

An Economic Survey.

AT the close of the year, thirteen months after the declaration of the Armistice, it may be interesting to consider a few figures relating to economic conditions. The most disquieting item is the cost of food, which, if the pre-war standard dietary is regarded, stands 134 per cent. above the prices

Part of Pediment, New Parliament Buildings, Winnipeg. The late ALBERT HODGE, Sculptor.

prevailing in July, 1914. The cost of living has so much to do with the increase in wages that it is a pity the total increase in wages during the war period cannot be given in a percentage to compare with the cost of living. The statistics contained in the *Labour Gazette* do not refer to large classes of persons such as agricultural labourers, seamen, railway servants, &c., but so far as can be seen the cost of food has risen only 3 per cent. since the date of the Armistice, but in the eleven months of this year the classes tabulated for increase of wages have benefited by an amount exceeding that percentage, as 5,343,000 persons have received an increase in rates of wages per week amounting to £1,908,900. This increase in wages has been accompanied by a substantial reduction in hours. Workmen's Compensation has now been increased 70 per cent. on the pre-war level, and Old Age Pensions 50 per cent. It is not what are termed the working classes who have any hard conditions to face as the result of the war, but those on small incomes reduced in every way, and who have to meet the increased cost of living and of labour. Has labour faced the conditions of peace with the same fortitude displayed by all classes in the war? A partial answer to this question is given by the figures relating to trade disputes. In the last year of the war 982,000 workpeople were involved in disputes, and 5,030,000 working days were lost. In the year since the Armistice, *i.e.*, from January to December 1st, 2,557,000 workpeople have been involved in disputes, and the loss of working days has been 32,769,000. Thus, on the one hand we have a weekly increase in the rates of wages of nearly £2,000,000, and on the other hand a loss of over 32,000,000 working days, which may be said to have cost the working classes and the country some £100,000,000—a sum about equal to the increase in ratio of wages for the same period. Conditions such as these cannot continue; wages cannot be maintained at a high level whilst industry is paralysed by strikes. Unemployment amongst trade unionists is only ½ per cent. higher than a year ago, and some of this unemployment is due to the strikes and labour disputes.

Trade Disputes and Dislocation of Industry.

WE venture to think that few persons would have prophesied that the country could have been in nearly so favourable a condition as it is at the conclusion of a war of such a character, and involving such a prolonged dislocation of ordinary conditions, but at the beginning of a new year it is the duty of everyone to consider how the mistakes of the past year can be avoided, and one of those most obvious mistakes is the dislocation of industry at this most critical period by constant disputes followed by strikes or lock-outs. It is to the interest of the whole nation that a peaceful and reasonable means should be discovered for obviating a recourse to force in the settlement of disputes, and that the strike and lock-out should be regarded as deleterious to the national prosperity as is war itself.

Indian Art.

THE establishment of a lectureship in Indian Art is one of the immediate aims of the India Society, and we trust it may be accomplished ere long as a fuller appreciation and knowledge of Indian art could not fail to be desired in this country. It might be well if some means could be found for establishing the traditional craftsmanship of India on some secure basis, so that manufacturers of various art products could more readily procure it. In a great variety of decorative work the Indian craftsmen might make their influence felt here.

The Nurse Cavell Memorial.

WITHOUT any desire to prejudge the character of the monument now in course of erection to Nurse Cavell, we confess to having experienced considerable apprehension in noting the height of the scaffolding erected. And if the interview with Sir George Frampton, which appeared recently in a daily paper, is correctly reported, and the total height given by the sculptor is about 40 ft., then our apprehensions are justified. In regarding the site, a very important one, we can hardly believe that such a scale was decided on in consultation with any responsible architect. It would appear to be another instance of that unrestricted individualism which serves public interests so badly. A "one man" show is not what we want for our public memorials, but statuary, properly co-ordinated to its surroundings. To erect such a monument, of such a scale, on such a site, is not completely to express it, but to dominate it with a towering obstruction injurious to the effect of all the surrounding buildings, which it will dwarf and obscure.

Gift Sculpture.

WE appreciate the good-will of the sculptor in giving his time and work; but we consider that where important public interests are concerned the acceptance of such gifts is greatly to be deprecated. It robs the public of the freedom to approach the subject completely on its merits, which is so desirable, and also intercepts the freedom of choice. It is not fair to other sculptors, who are thus prevented from competition; or fair to the public, who may thus be denied a better monument. We offer no criticism here of the work itself, but the principle is wrong and to be deprecated. The whole subject raises issues of a grave and far-reaching kind, to which we hope to return later at greater length.

Records of Roman London.

IN the foreword to the records of Roman London, published in the *Builder* from 1847 to 1915, which we give this week, Professor Lethaby invites anyone who has special knowledge of finds made in London, however unimportant they may seem, to put them on record—and, we may hope, send them to us for publication and record. In the years before us there will probably be great building activity in London and on ancient sites, and in the necessary work of excavation, &c., remains of greater or less importance will no doubt be found. These should be carefully noted and recorded, and we invite architects and builders to use our columns for the purpose.

Head of "Mars."
The late ALBERT HODGE, Sculptor.

GENERAL NEWS.

Mr. Ernest Newton, R.A.

We are pleased to note that Mr. Ernest Newton, R.A., who was operated upon on Christmas Day for appendicitis, is making satisfactory progress.

The Housing (Additional Powers) Bill.

The Lords' amendments to the Housing (Additional Powers) Bill were considered in the House of Commons last week, and agreed to. Most of the amendments were drafting amendments, or the result of an understanding arrived at in the House of Commons at the Report stage.

Godmersham Park.

Godmersham Park estate, between Ashford and Canterbury, which consists of 6,000 acres, is for disposal by order of Lord Masham. The mansion was built in 1732, and is a typical example of early Georgian work. The decoration is of the same period, including examples of work by Grinling Gibbons and the brothers Adams.

Middlesex War Memorial.

The First Commissioner of Works has intimated his willingness to consider the erection of the proposed memorial in the Canning enclosure, Westminster, to the men of the Middlesex Regiment who fell in the war. The design and actual position must, however, first be approved by the Committee which is dealing with the question of the sites for statues in London.

Proposed City Street Widening.

The inhabitants of Aldersgate Ward have decided to oppose the scheme of the Corporation to widen Aldersgate-street from the Post Office to the Manchester Hotel, at a cost of £750,000, being of opinion that "such widening is not at present required, the street being wide enough to accommodate for years to come all traffic that may desire to use the thoroughfare."

An Old Mansion Destroyed.

Fetternear House, Kemnay, one of the oldest mansions in Aberdeenshire, was totally destroyed by fire last week. Most of the collection of pictures was saved, but a number, including five by Landseer, were destroyed. The house contained what is stated to be one of the finest collections of Chippendale furniture in the country, and this was completely destroyed, as also was a fine collection of Queen Anne silver. Fetternear House was originally built in 1329.

St. Bartholomew the Great.

In response to the appeal of the Restoration Committee, a sum of £900 has been received in order to secure the remaining six bays of the east walk of the cloister of St. Bartholomew the Great, and the site has now been definitely secured. A further sum of £1,300 is required to complete the purchase. Subscriptions should be sent to the Rector, St. Bartholomew the Great, London, E.C.

"The Ideal Home."

This is the title of a new monthly illustrated journal for "home lovers," published by the proprietors, Odhams, Ltd., 85–94, Long Acre, W.C. 2. The journal will cater for the middle class and matters of interest in the designing of the house and garden and the final finishing touches will be explained and illustrated. The issue before us contains several admirable features and is charmingly illustrated. The price is 1s. net.

Luxury Flats in New York.

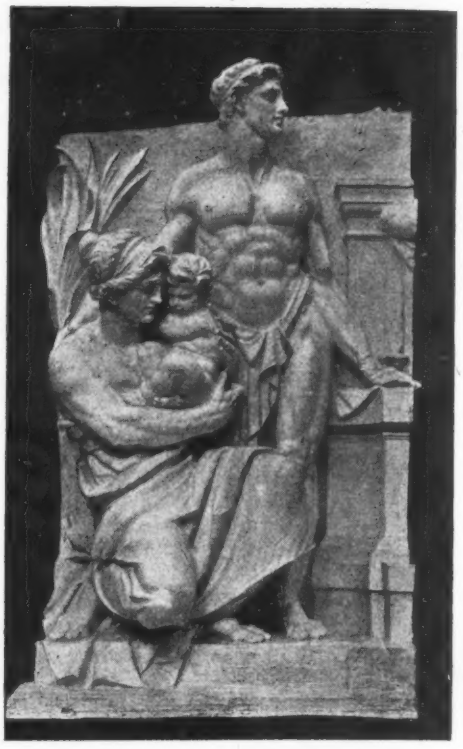
It is stated in the Press that a number of New York millionaires, unable to find suitable accommodation in New York, have jointly ordered the erection of an apartment building, to cost about £800,000, and a valuable site has been acquired in the best part of the town. The building will consist of flats with from twenty to thirty rooms, each flat containing eight or ten bathrooms, and also a few flats with four of five rooms each.

The New English Art Club.

The New English Art Club will hold its next exhibitions in the Galleries of the Royal Water Colour Society, 5a, Pall Mall East, during January and June, 1920, and thus resume a series temporarily interrupted because the War Office took possession of the Galleries in which the Club had lately had its home. The New English Art Club was founded in 1885 by artists who felt themselves out of sympathy with the official art of the time, and throughout its existence the Club has formed the channel by which the work of many of the most prominent painters of the day was brought to public notice.

St. Dunstans.

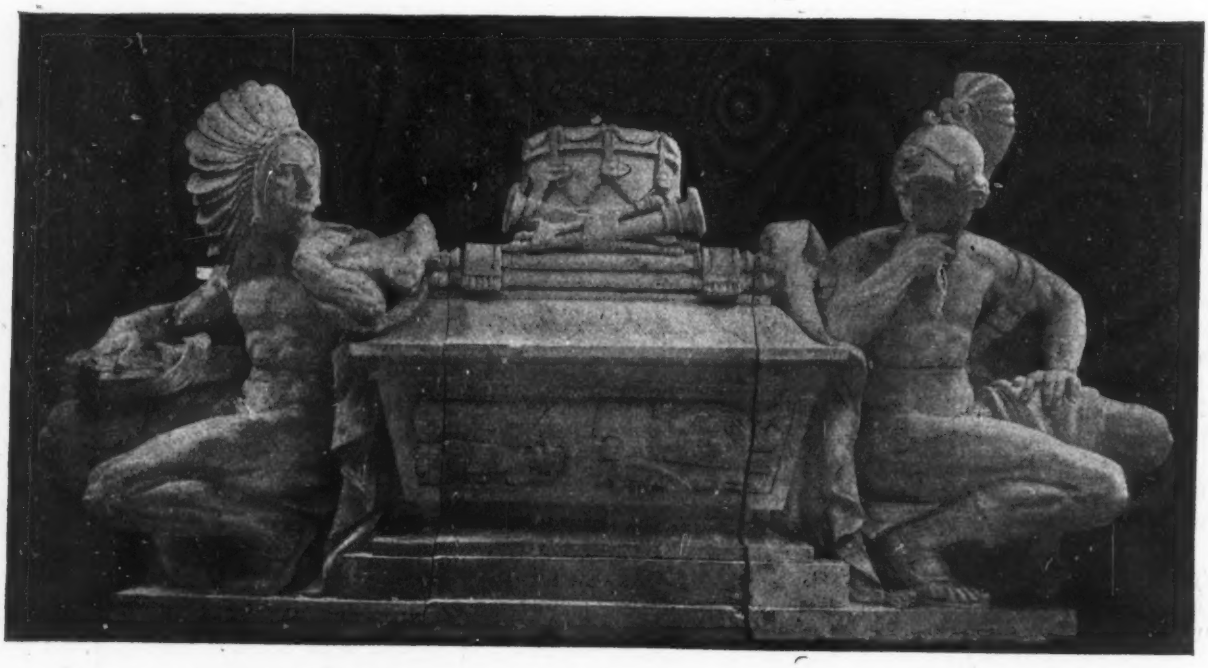
The Hon. Assistant Organising Secretary of St. Dunstan's Day, in aid of the Blinded Soldiers' and Sailors' After-care Fund (Mr. C. E. Town, 13, Wallbrook, E.C.4) asks us to inform our readers whom his appeal has failed to reach that he would be very pleased to despatch to them such quantities of the special St. Dunstan's Fair adhesive stamps, in sheets of 72, as they will retain or can dispose of. The cause is the after-care of the men who have been blinded in the defence of the Empire, and everyone should do their bit, however small, to place St. Dunstan's Hospital on a firm and permanent basis.



Part of Pediment, New Parliament Buildings, Winnipeg.
The late ALBERT HODGE, Sculptor.

The Post Office London Directory.

Some definite indication of the changes in business affairs may be gathered from the new issue of Kelly's Directory which we have just received. For nearly a century and a quarter, the London Post Office Directory has been published by Messrs. Kelly; and in this last edition it has been found necessary to make nearly a quarter of a million corrections and additions, as against about 170,000 in the previous edition. Whereas little more than a year ago the number of offices in the city which were without tenants seemed almost endless, the present difficulty is to find one office or part of one unlet. The names of architects in the directory reaches close on 850.



Part of Pediment, New Parliament Buildings, Winnipeg. The late ALBERT HODGE, Sculptor.

A NATIONAL MEMORIAL.

BY C. STANLEY PEACH, F.R.I.B.A.

INASMUCH as the scheme for a National Memorial is a suggestion and an appeal rather than a design, the advent of a new year—the birth, perhaps, of a new epoch—and the approach of the climax of the greatest calamity which has yet befallen humanity, presents a propitious occasion for its introduction, and for considering what the aim and scope of a National Memorial should be.

The term "War Memorial"—a thoughtless misnomer, like many phrases coined and current during these latter years of acute strife—is in common use, and denotes works of tribute, or commemoration of deeds which are landmarks on the quicksands of time, and acts of self-abnegation and devoted heroism which are the greatest redeeming features in an epoch of failure, martyrdom and world anguish. Until they are devoured by time, if read aright, the facts are the greatest monument, but they have already begun to sink into the quicksands. The tide is slowly but surely effacing the lessons written on the sands, and mankind re-occupies the seats in the Theatre of Orpheus. The brightest spark of hope in much that is dark is the fact that there is no general desire for a war memorial, and the strong feeling that there can never again be a memorial to laud the pride, pomp and circumstances of glorious war, or to render it attractive as has been done in the past. All now recognise that such a monument would be a moral catastrophe surpassing, if it were possible, the material calamities and failures themselves. Ethically, a National Memorial has no connection with war except in so far as it can expose its atrocity and waste, and turn it to account as an aid to prevention.

A National Memorial deals with the whole and not a part. It is directed to a cure of the disease itself, and not to mere treatment of its manifestations. It is an instrument, and, perhaps, the most powerful means available, to bring within the average understanding the true causes and effects of each event, and of the methods, which culminated in a human sacrifice and a destruction of world resources which no words can adequately describe. Indeed, description is unnecessary, because the results as shown by the events of the past five years stand out beyond all previous ages as a monument to the failure of human endeavour. Therein lies the opportunity. It may be said to-day, as it was said in the past: "Inspired by God to utter the sublime words—regeneration, progress, new mission, the future—mankind has ever persisted in attempting to realise the material triumph of the programme. To substitute the idea of a caste for the ideal of the emancipation of all by all. To deal with the individual rather than the unknown quantity—humanity. To separate the moral from the economic, to accept Association as a principle and a method, and to adopt its utter negation in practice." The epoch to commemorate is one of progressive revolution.

The first aim and continuing purpose of a National Memorial is to co-ordinate all the efforts which are being made in many directions to bring the idea before the world, and to minimise the effects of failure. To expose the vicious systems of education and distinctions which in the past have created a pre-disposition to war, and to eradicate the habit of chronic strife which has been the culture bed for the germs of war. To destroy the supine attitude towards human sacrifice and the acceptance of the waste of strife as the one and only means of progress and the rational method of dealing with differences or difficulties, individual, collective or national. To train teachers in the ethical and economical principles of production, and in prevention of waste. To these ends to record and use the events of this epoch of failure, as an instrument to make regeneration a daily act instead of an idle word. By its size and proportions to be a perpetual reminder to the present, and a warning to future generations, of the magnitude of human sacrifice, perpetrated by civilisation for freedom. To devise a "White City" as an atonement for mankind's crime to humanity whence the most hideous bloodstain ever placed by man on the works of the great Architect of the Universe may be purged from earth.

There is nothing new in this. Time and again it has been said throughout the ages. Its truth has been admitted, but the only action which has followed has been to give the road to destructon, and repetition of failure, a new name; to use it yet again in spite of experience in the same way, and to reach by it exactly the same kind of result, but each time by a greater and more atrocious sacrifice. Revolting as such a course would be if adopted by savages, it is beyond description when pursued by civilised communities. Is it to be said that a generation which by co-operation and co-ordination of effort, by association and brotherhood, produced an efficiency of destruction almost superhuman in its completeness, its degradation, its mental and physical anguish and torture is unable or unwilling, by the same means still at its command, to solve the more important, even though it be the more difficult, problem of humanity?

If it indeed be true that Great Britain led the way in war, is it not her most sacred duty to lead the world to reconstruction? Are our material necessities so absorbing that we have no power left to think on new lines, but must concentrate as in the past on the economic problem to the exclusion of the moral?

Are the architectural and kindred professions of the sciences and arts content to stand by and see the world repairing the old road, or are they prepared in association to take their part in the van and forefront of a rational movement towards ending strife, and in making a new road as a step, even if it be only a small step, to preventing a recurrence of such a catastrophe which has afflicted mankind in this generation? The work is far beyond the powers of one man, even if one existed of such ability, strength and energy as to be able to bear the burden.

It can only be done by association, by the same methods that reached superhuman efficiency of destruction, for, if done by any other means, the memorial would lose the great educational value which lies in the contrast of the productivity of concord and co-operation with the waste of strife. War has shown what science can destroy. It is for peace to prove what imagination can create. The sole considerations which should inspire the design and govern the decision are the ethical and educational aims. To them the æsthetic and economic are subservient, and are valuable only so far as they contribute to construction and are able to express the aim and purpose. No man can dispute the necessity for action on new lines or the advantages to humanity of the aim. If these be admitted, it is moral cowardice to fear the means and to take no action.

There is no precedent for this transference of accepted principles to constructive lines. It calls for imagination, for faith in the future, for combined national effort, for the co-operation of many minds, if an instrument is to be found which can turn the hearts of the disobedient to the wisdom of the just.

There are, however, many examples of what to avoid. All will admit the æsthetic and economic qualities of Waterloo Bridge, and agree that for dignity, grandeur and repose it is worthy to commemorate a great event. None can deny, though all must deplore, that to the vast majority who cross the Thames by it to-day it is simply the direct road to the terminus of the London and South-Western Railway. That it commemorates an epoch closely analogous to that which lies immediately behind us, whose events were notable for the announcement of principles, their general acceptance and their complete negation in practice, and which culminated in just such a failure as we have witnessed, and produced the same kind of human sacrifice as a yet more advanced civilisation has again perpetrated, does not occur to one in a million of those who pass by.

When the whole world was rushing headlong down the same old road to destruction, it exerted no restraining influence. It conveyed no warning to those whose daily life had been spent in the midst of strife, that the inevitable result was sacrifice. Its æsthetic and economic perfections completely obscured any ethical or educational qualities with which it was endowed. It failed to achieve its purpose as a memorial, and sunk to the same level as other monuments conceived in the same spirit. It is to-day a mere improvement, a new bridge on the old road to ruin. Even its baptismal name has not redeemed it from utilitarianism and ethical inutility. A similar fate awaits many of the so-called war memorials to-day. It is only a matter of time. The same pernicious poison—the glorification of war—the concealment of its hideous visage—emanates from them and contaminates the conscience of mankind. Their very inscriptions in some cases proclaim yet again the "pride, pomp and circumstance of glorious war," give honour to the extent and glory of slaughter instead of conferring the crown of martyrdom. Many are false conceptions in which the magnitude of the events and the issues thereof so far from being the parents, are not even represented at their sterile birth. No paving stone on edge, even if it be of abnormal size, has any power to convey to an average intellect appreciation of the magnitude or atrocity of a human sacrifice whose victims of all nations laid head to heel would pave a path nearly 10,000 miles, and longer than the diameter of the earth. Still less can it make clear that this path of death, of wasted, untold potentiality, was the obvious and inevitable outcome of the habit of strife engendered and fostered by the training and practices of peace. Always the same bare, plain road in peace, decorated for the procession of the victims to the altar in war. No one will question the economy of such memorials. None will infer from them that the waste of world resources has amounted to some £4,000 for each victim immolated on the altar of failure.

Can the man in the street deduce from any suggestion for a "war" memorial yet propounded that the waste in five years of war, collected in a chain of sovereigns, would extend to 552,400 miles, and would be sufficient to girdle the earth with gold twenty-two times at the Equator? Could he infer that such a mass of gold, of wasted wealth in war, is more than enough to carry out and to endow all the most perfect Utopias that the most advanced thought has ever pictured, even in visions?

The ethical and educational value of many memorials may be found from the proportion that the well-known cenotaph in Whitehall is to one and a-quarter times the diameter of the earth as the gain to humanity is to the magnitude and waste of the sacrifice.

Towards its erection and as the price of atonement for a crime to which all have contributed, and to lead mankind to a new road, the people of Great Britain will spend less than a quarter of a farthing per head of the population, or nearly a farthing in addition to the tombstone, as the tribute to each human being that has passed from life to eternity, because the generations from Waterloo to Liège have turned a deaf ear to the voice of reason, and have accepted strife as the rational adjustment of right.

Neither the people of Great Britain nor of other nations can understand the full meaning of these facts any more than they grasp the relative value of the word "millions," which so glibly passes from their lips. It is within the power of a national memorial to demonstrate both.

If mankind understood, the whole road would be utterly and completely destroyed. Regeneration, progress, new mission, the future would pass from sublime expressions to practical facts.

That is the aim, the scope and purpose of a national memorial. Will the artists of Great Britain lead the way, or is the only solution of the problem to bury our dead out of our sight?

CORRESPONDENCE.

Quantities in the London Area.

SIR,—In reply to Mr. Ernest A. Tyler's letter in your issue for December 19, it is surely necessary in the present emergency to enlist the services of as many builders as possible, both small and large, whether they have been accustomed to the erection of houses in the past or not; and I maintain that quantities are not a luxury but are really a necessity. Some firms of contractors are rather disinclined to tender for housing schemes because of the risk involved, but to invite tenders without quantities would only make matters worse. It is to the employers' advantage as well as the contractors' to reduce the element of risk as much as possible. The builder who in these times merely reads the specification and looks at the plans before sending in a tender is little better than a gambler.

Mr. Tyler apparently holds the opinion that it necessarily follows that if quantities are supplied then there must be considerable variations and extras. Why? If it is found possible to carry out the work in accordance with the plans and specification without variation, and the quantity surveyor has done his work properly, it should not be necessary to adjust the quantities. The builders who put on £20 to £50 per house to provide for the time in measuring and settling up must have been very unfortunate in their experience of quantity surveyors. Mr. Tyler inquires: "Why were quantities not adopted previous to the war?" My reply is that to my knowledge they were adopted by at least one very large housing company for several of their estates where houses were erected by contract and by direct labour, and in both cases the results were extremely satisfactory, and in the latter case, especially, there was a very considerable saving, owing to the materials being ordered from the quantities and supplied to the foreman in charge who was held responsible for any excessive waste of materials and labour.

With regard to expense, the cost of quantities for housing schemes where there is so much repetition is inconsiderable, and the quantities can be used to advantage (with, perhaps, slight modifications) over and over again, and they can be expeditiously prepared if entrusted to surveyors accustomed to this class of work.

CHARLES H. TAYLOR.

SIR,—Mr. E. A. Tyler, in his letter, states that builders who are accustomed to undertake cottage building do not desire quantities. I think Mr. Tyler overlooks the fact that as a rule the builders of cottages build them as a speculation on their own account, and not for other people. Where there are large housing schemes, as has been the case under the London County Council and other authorities before the war, quantities are necessary. It is essential for the builder to know exactly what he has tendered for, and it is equally important for the employer to know the cost beforehand, and to be able to have any variations properly adjusted afterwards, should there be any. If a man is building cottages on his own account, he naturally tries to save expense in every way. If he is building them for someone else, both sides require to know exactly what is included in the estimate. Both drawings and specifications generally leave some opening for questions on certain points, and if the work is varied in any way when it is carried out it is very difficult to ascertain the right amount for the variation unless there are quantities to refer to. Of course, in very small cottage property, builders frequently manage without either an architect or a surveyor, but these are cases where they build for themselves, and the question does not arise.

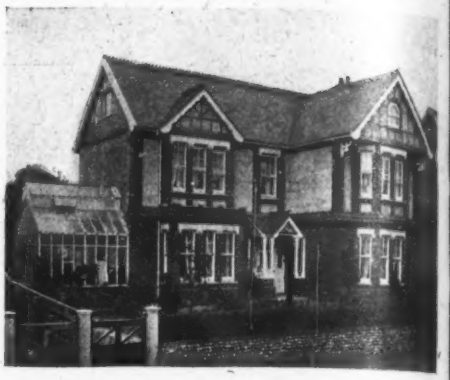
GUY M. NICHOLSON.

The Unemployment Dole.

SIR,—Your remarks are timely. This dole has been a scandal, and has kept thousands of men out of work for a year when labour has been so scarce. It is part of the present process of "making this England of ours a place fit for idlers to live in." In our towns and villages the younger men have enjoyed a long leisure and visited round:—Why work, with an income for doing nothing? The rougher and older men have stood and smoked at street corners day by day for months past, some occasionally doing a little "work" surreptitiously. One of these, to whom I offered a job he used to do, hesitated, saying he had "a little business at the Labour Exchange." Asking others what it meant, I was informed "They don't like to disturb their unemployment pay!" Years ago we read "Self Help," and were taught that the diligent and thrifty were commendable; now such men are accounted scoundrels, and the slacker and schemer who gets his hand in the public pocket is admired and coddled. "A.R.I.B.A."

A Plea for Clay Lump Houses.

SIR,—I have been struck by the apparent prejudice or ignorance which prevails at the present time against the use of clay lump as a building material by people who have not or will not make an unbiased study of the subject. I was at a housing conference a short time ago at which the Commissioner, Major Douglas, was present, when the Secretary described clay lump houses as mud huts. I was also present at a housing committee meeting when Major Douglas stated that the Government would take no responsibility if clay were used.



In the *Builder*, published December 26, I notice that the Ministry of Health has accepted the *pisé de terre* method of construction with rammed earth. I have had no experience of using rammed earth as a building material, but rammed clay instead of earth was used in the construction of a local workhouse over 100 years ago with no exterior facing. The walls at the present time show no signs of deterioration or dampness and are perfectly sound.

In my opinion, clay lump has many advantages over the *pisé de terre* system; for instance, the chimney breasts and flues can be built to any shape as the walls proceed. A 9 in. clay wall is sufficiently strong for any two-story house as compared with an 18 in. rammed earth wall, and is adaptable for any building from a shed to a mansion irrespective of what style of architecture may be preferred. A further advantage is that no scaffolding is required save a few trestles and boards, as the walls are built from the inside. There is no waiting for the walls to dry, for, as soon as the walls are high enough, the floor joists can be put on, and immediately proceed again to the wall-plate level, when the roof can be put on at once. When covered in, it is advisable to wait for a week or two before commencing the plastering, but during this period the internal woodwork can be proceeded with. March to the end of October is the best period for carrying out clay work, but once covered in the exterior walls will take no harm if left for six months before facing the outside. Very little skilled labour is required in the construction of clay lump walls beyond that necessary for the erection of the foundations and a concrete or brick wall for a height of about 18 in. above the damp course from which to commence the clay work.

It is very necessary in building with clay lump that the exterior faces of the walls should be protected from the inclemency of the weather. This may be done in a variety of ways, but the two most common forms are a 4½ in. brick facing, which should be well clamped to the clay walls, or the walls can be roughcasted above the brick or concrete plinth. In the latter case it is necessary to provide some key for the cement, and during my experience I have found the following to answer admirably:—Cover the walls with ordinary wire netting, 1½ in. or 2 in. mesh, from top to bottom, securing it by nailing ordinary ceiling lath horizontally with 2½ in. cut nails. The inside plastering can be done without any preparation.

I enclose a photograph of a house I erected with clay lump over fifteen years ago, and which I occupy. I am prepared to give to any charitable institution, named by the Editor, the sum of £10 if any person appointed by him can discover any sign of settlement or dampness in any of the clay lump work.

COLIN BATEMAN, J.P.

Attleborough, Norfolk. *Retired Master Builder.*

[In a letter to the Editor, Mr. Bateman says that 75 per cent. of the houses in the part of Norfolk mentioned are built of clay lump.]

Inquiry.

A correspondent would be glad to find out the makers of "Kay" porous clay blocks. The blocks were triangular in section, about 3 in. by 3 in. by 9 in., and were for ventilating damp walls with a view to remedying the defect.

The Boudoir, Sion Hill, Thirsk, Yorks. Mr. WALTER H. BRIERLEY, F.S.A., Architect.

EXHIBITIONS OF THE WEEK.

Pastels at Messrs. Derry & Toms. Fantin Latour at Walker's Galleries. The Art of the Year.

VERY appropriate to this Christmas season is the present exhibition of pastels and red chalk drawings by Alfred Palmer, at Messrs. Derry & Toms' Kensington Galleries, which closes on January 4—for Christmas is the children's season, and Mr. Palmer in these studies is most successful with child life. His summer bathing scenes of children on the sands—"The Red Parasol," "The Promenade," "Sea Urchins," "The Brownie," "La Toilette"—are fresh, clean work, full of life and movement; and two little child studies—"Sleeping Child" (red chalk), and "Tecca"—are very charming. Less successful and convincing are the Eastern scenes, some of which are in oil; though here, too, he seems most at home in pastel in his studies of "Gib" and "Negro Head, Tunis."

At Walker's Galleries that fine artist, Fantin Latour, appears now in a well-selected series of lithographs, which are delightful, both technically, in the handling of the soft rich blacks, and in their inspiration. We feel that the artist must have been himself a musician, or at least passionately devoted to music; for it is Polymnia who seems to be the motive of many of these subjects, and who, perhaps, appears in person in "Le Poète et la Muse" and "Musique et Poésie." The same suggestion might apply to one of the best of the series—"L'anhiversaire de Berlioz"—while the two scenes of the "Rheingold" are no less brilliantly handled. For Fantin Latour is a master of the subtleties and beauties of the female form, though it may be permitted us to suggest that there is a certain monotony in his types, and that occasional figures, such as his "Eve," are heavy and uninspired. But as a whole the exhibition is thoroughly satisfactory, and can only enhance the great reputation which this master deservedly possessed. "Facts and Fancies," by W. H. Walker, in the same Galleries, are in a lighter vein, the colour-wash being aided here by pen-line, the subjects from fairyland or quaint fancies.

In this New Year's issue it may be of interest very briefly to glance back over the past year's art, and take stock of its results. In the early months of the year we had the successful "Canadian War Pictures," which we then described as the best organised war exhibition which had appeared; and we have now again, at the year's close, war pictures occupying the walls at Burlington House. The Royal Academy of the present year kept a good level; and the smaller galleries throughout the year have shown some material of great interest, among which we noticed specially the late Edward Stott's memorial exhibition at the Fine Art Society, while the claims of modernist art have found adequate recognition at the Eldar, the Goupil, and lately at the Leicester Galleries.

The time is one of change, of fresh creative development in art as in other sides of life; and in these columns we have always welcomed these new forces, while reserving our full liberty of critical judgment, and believing that Time will keep the good seed and throw away the husks.

MEETINGS.

MONDAY, *January* 5.

Royal Institute of British Architects.—Business meeting. At 9, Conduit-street, W. 1. 8 p.m.

WEDNESDAY, *January* 7.

Institution of Sanitary Engineers.—Presidential Address. At Caxton Hall, Westminster, S.W. 7.30 p.m.

Edinburgh Architectural Society.—Mr. Sydney H. Miller on "The Giving and Getting of Apprenticeship." At the College of Art, Edinburgh. 8 p.m.

THURSDAY, *January* 8.

L.C.C. School of Arts and Crafts.—Sir Banister Fletcher, F.R.I.B.A., on "German Renaissance (1500–1900)." At Southampton-row. 6 p.m.

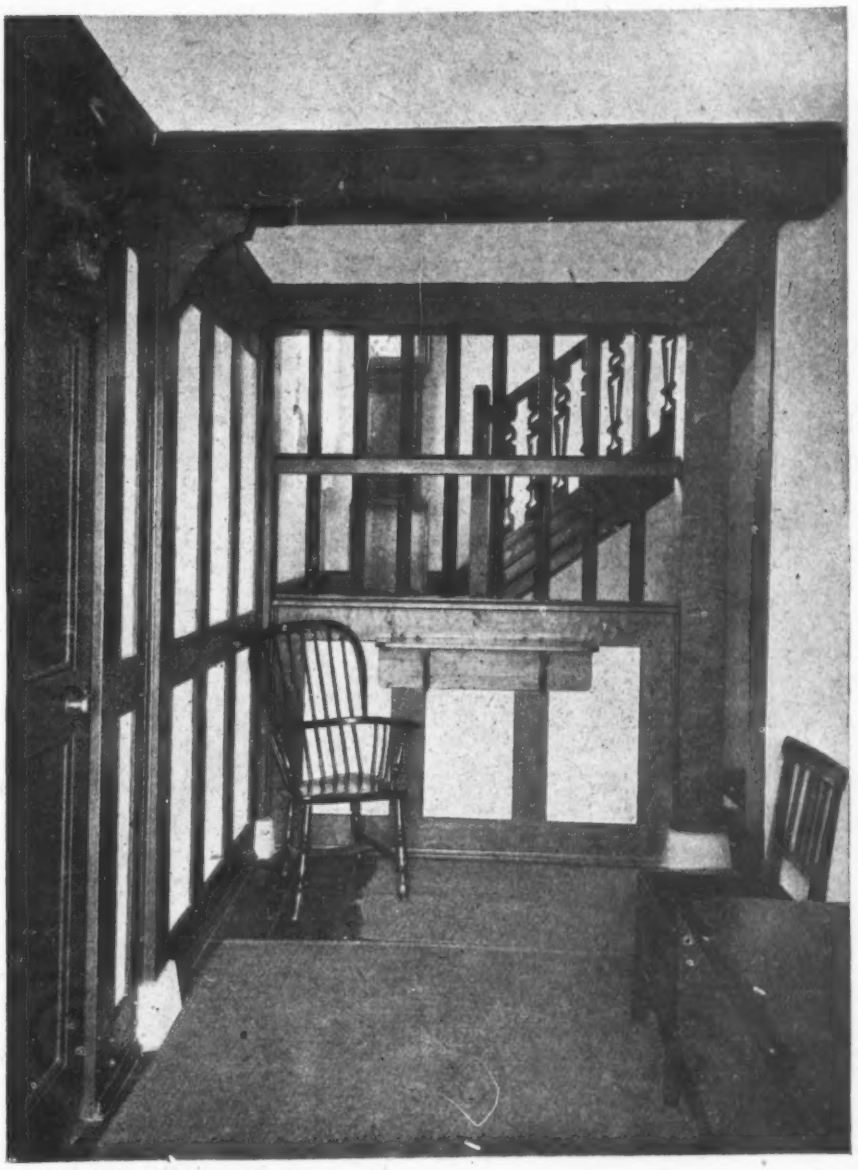


Photo: Thos. Lewis.

Blue Bell Inn, Ingleby Cross, Northallerton.
MR. WALTER H. BRIERLEY, F.S.A., Architect.

THE TIMBER DOMESTIC ARCHITECTURE OF KENT, SURREY, AND SUSSEX.

In a paper read before the Royal Archæological Institute recently, Sir Henry Howorth, D.C.L., F.S.A., presiding, Mr. Philip M. Johnston, F.S.A., F.R.I.B.A., said that where civilisation (or artificiality) had not been carried to an extreme, as in the cities of the modern world, architecture would always be found to be closely bound up with local geological conditions. Thus, in a limestone country like Gloucestershire, except in the towns, timber architecture would be sought almost in vain, and the same might be said of all the stone districts of England, and of Scotland and Ireland as a whole where stone rubble, to be had for the digging, was not only plentiful but obviously suited to climatic conditions. Mud, or clay, or what it was fashionable to call *pisé* architecture, as primitive as either, and racy of the soil, might be termed a connecting link between timber and stone building, and brick, its town-bred daughter—itself of quite respectable antiquity—seeing that it carried us back to the Tower of Babel. In the western and south-western counties of England clay boundary walls, coped with brick and tile, were still commonly to be met with, and cottages and farm buildings built of that useful material still abounded. The author had tenanted a so-called "mud"

Edward III Window in Hall, "Wardes."

cabin, with thatched roof, in Ireland, and could vouch for its dryness and comfort in a cold, wet summer.

But where good oak timber abounded—as it never seemed to have done in Ireland—for example, in the midland, eastern and south-eastern counties of England, a timber architecture had naturally prevailed, especially in the case of houses great and small, from the earliest times. At one time the majority of the churches in these districts must also have been timber-built, and even yet a lengthy list of isolated survivals could be pointed to, beginning with the well-known Saxon church of Greenstead, Essex, with a nave formed of split elm trunks tenoned together, dating perhaps from the ninth or tenth century; Cheshire, as in the case of Nether Peover, Marton and Warburton; and Shropshire and Worcestershire furnished later mediæval examples of half-timber church architecture.

Timber belfries and porches survived in some of these north-western counties, as well as in the three south-eastern counties, as also in Hampshire, Essex and other counties—showing how hard to kill was the native timber tradition in church building. Surely our timber spires, like our magnificent timber roofs of six or more centuries, were among the peculiar glories of England. We were once a nation of carpenters—do not let us be ashamed of the boast, nor let the grand old traditions of this craft die out in favour of iron and concrete, machine-made this and cast that, and standardised the other. Soul-less horror! Experience had proved that if a fire-proof material was wanted, we were safer within walls of oak and clay than shut up in an iron and concrete box, which might crumple up and bury one in its ruins. And as to the relative beauty of the two methods, who would dare even to compare them?

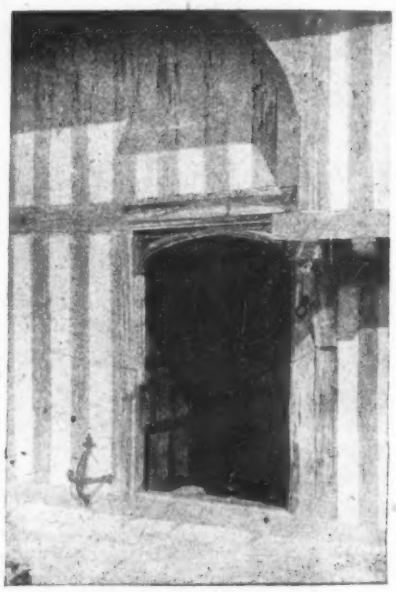
It was not, perhaps, generally known that besides these timber-built churches of the north-west, there is, or was, a group of half-timber churches in Surrey and Sussex, viz., at Frimley, Surrey, and Loxwood and Plaistow, Sussex, of which the half-timber building at Loxwood, secularised, still remains. There were also in the border-land between Surrey and Sussex several timber-built towers, *i.e.*, of massive oak framework built up from the ground and covered with oak weather boarding, as at Newdigate, Burstow, Itchingfield and Rogate. Essex and Middlesex furnished other examples of this primitive and delightfully native form of building, and these timber towers, which must be associated with a far more numerous class of turrets appearing above the nave roof, with timber legs and framework carried down to the floor inside, could be assigned to the thirteenth, fourteenth, fifteenth and early sixteenth centuries. Nor must another highly interesting class of timber buildings be forgotten, forming part of our ancient churches, viz., the wooden porches, of which Shropshire, Worcestershire, Berkshire, Oxfordshire, Hampshire, Suffolk, Essex, Middlesex, Kent, Surrey, and Sussex afforded a long series of charming examples, dating from the twelfth to the sixteenth century.

As one pondered these, as one recalled the Saxon spire framing at Sompting, Sussex, the Saxon wooden church at Greenstead, the eleventh century roof of Winchester Cathedral, and the thousands of timber houses up and down England, dating in some cases from the thirteenth and even the twelfth century, one was simply flabbergasted by the bland statement put forth by the Minister of Health in the present Government, that the life-time of a wooden house was twenty-five years! If he had said an Army hut, one could have understood him. But if even the reference were to the tarred or painted weather boarded houses of Baltic fir, still so common in the old suburban parishes of London, and in country districts

"Wardes" (Before Restoration).

"Wardes," Otham, Kent (Before Restoration).

of the home counties, the folly of such a statement was self-evident. One knew literally hundreds of this type of timber-framed and



Doorway, "Synyards," Otham, Kent.

timber-coated houses built in the seventeenth, eighteenth and early nineteenth centuries, still "going strong," and in most cases good for an indefinite period of future usefulness—besides which this type of timber house was cool in summer and warm in winter, owing to the stratum of neutral air between the outer boarding and the inner coat of lath and plaster. For picturesqueness a sheeting of rough elm boarding, left in the natural state, or coated with a preservative, was hard to beat, coupled with thatch, whitewash and old red bricks. Again, the speaker recalled the fishermen's quarter on the beach, and climbing the cliff-base, in Old Hastings. What could be more delightful and suitable to their position than that oft-painted cluster of old black weather-boarded houses and drying sheds, tarred over and over again till the tar was half as thick as the boarding. We owed this type of timber house, perhaps, to the Dutch or Flemish, who taught our ancestors so many useful arts from the thirteenth century downwards. And here the curious point came in: When did we first begin to import fir timber for building and joinery work—Memel, Dantzig and Riga, Swedish, Norwegian and German, red, white and yellow deals in all their varieties? It

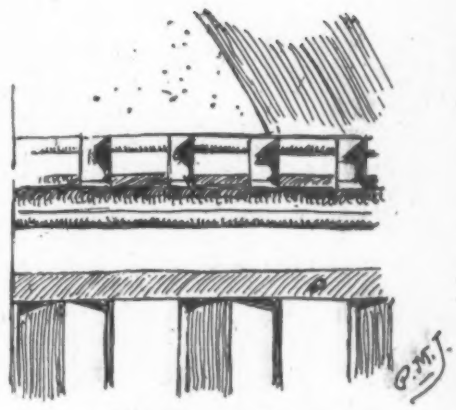
"Synyards," Otham, Kent.

was almost as hard to say as it was to answer the somewhat related question: When did our forefathers begin the use of what they called "sea-coal"? But to give a guess, after much searching, he thought they were both introduced in the early part of the twelfth century in the south and east of England, although t was more than probable that the Romans, a thousand years before, had made considerable use of imported fir timber, and were by no means ignorant of the commercial value of coal, only they did not mine it scientifically, or take it beyond the localities in which it was dug.

As touching the lasting quality of these comparatively soft deal or pine boards, he pointed out that the pair of doors in the twelfth century doorway of Semperingham Church, Lincolnshire, covered with delicate wrought-iron scrollwork of that date, were of fir wood, coeval with the ironwork and still in good preservation. So also were the doors to the Chapter House in York Minster, of late thirteenth century date; but these, unlike those at Semperingham, had not been exposed to the weather. There was an abundance of documentary evidence bearing upon the early use of fir timber for joinery in this country in the Liberate Rolls of Henry III's reign. Thus, in 1232, the King ordered the window-shutters of the King's great chamber at Woodstock to be made "of fir (*verinas novas*), well bound with iron"; and in the same year he ordered the sheriff of Oxford to buy fir boards and put them about a certain well at Woodstock. Again, in 1252, the King wrote to his bailiffs of Southampton, "We command you to buy in our town of Southampton, for our use, two hundred Norway boards (*bordos de Norwagia*) of fir (*sapio*), and deliver them without delay to our sheriff of Southampton, to wainscote therewith the chamber of our beloved son Edward in our castle of Winchester." There was good reason to believe that imported deal (or fir) and pine boarding were much used and sought after from the twelfth century and onwards, and that where we should nowadays select oak or other hard wood, red deal or pine was employed both for its colour and figure and the ease with which it was worked. The terms "Estrich-boards," or "Ostrich-boards—*i.e.*, *Oëster-reich*, or Eastern country (or Austrian) boards—occurred in building accounts of the Middle Ages; and even the term wainscote, which was associated nowadays primarily with the best joinery oak, seemed to have been applied in the thirteenth century to these imported deals.

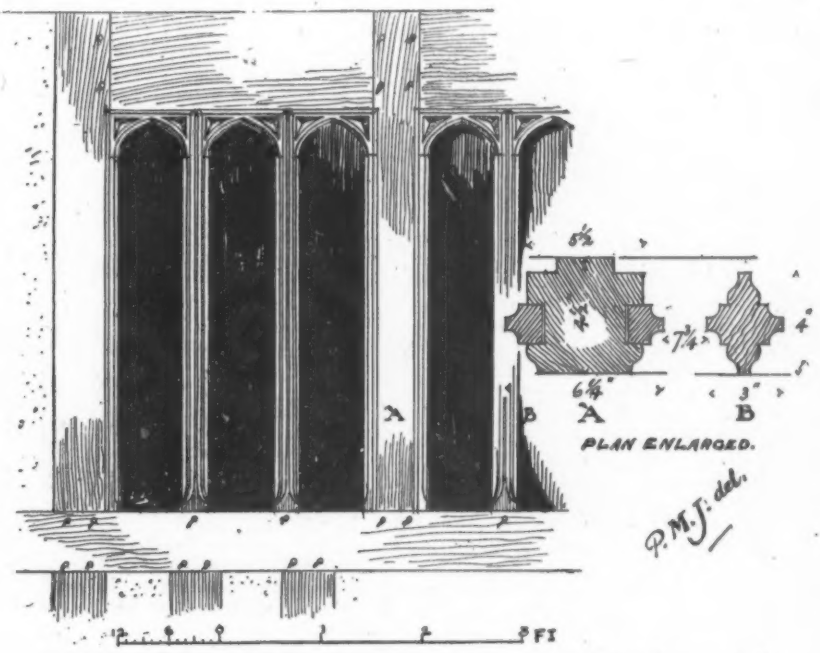
For structural timber, such as the framework of timber houses, floor-joists, rafters, beams, &c., either fir was not in these early times imported in sufficient scantlings or was not considered suitable, as there was no evidence of its use until the seventeenth century, or perhaps the Elizabethan period. Native oak, sweet chestnut, elm, beech, &c., were used for all heavy timbers, oak, of course, predominating.

In considering the timber domestic architecture of our south-eastern counties, it was noticeable that Kent was by far the richest of the three counties in these old buildings, and the type of building developed in one was markedly different from that of the same date in another. In all three counties the smallest and most primitive type of three or four-roomed cottage, a simple parallelogram—a type that persisted side by side with later developments—was still to be found, though rarely in an unaltered state. The speaker drew one of this type, shortly before its demolition, at Climping, Sussex, and the late Mr. Ralph Nevill, F.S.A., had drawn another in his "Old Cottage and Domestic Architecture in South-West Surrey.' But in Kent especially this primitive type of timber house developed in the early part of the fourteenth century, or perhaps even before, into a plan of central body, or hall, open to the roof, with double-storied wings, the parlour on the



15th Cent. Screen.

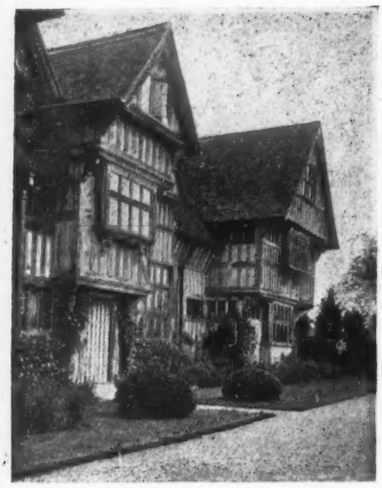
"Synyards."



Window, shuttered and unglazed, in upper part of Hall, "Synyards."

"Synyards."

House at Broad Street, Kent.



"Rumwood," Langley, Kent.

left, with the master's sleeping apartment over it, and the pantry, larder, &c., at the right or opposite end, also having one or two sleeping apartments above, for the female servants or children, the men employed by the farmer or yeoman to whom the house belonged being accustomed to sleep on the straw on the hall floor. This type of house had an open fire on a stone hearth in the middle of the floor, the smoke finding its way out through the unglazed windows or at the eaves of the roof. At first there would be no fireplace in the parlour or the bedroom over it, but this would probably be added early in the sixteenth century, when the luxuries of the great lords had spread to their tenants and servants. One of the best and earliest of this type of house was "Wardes," in Otham village, near Maidstone, where the central hall and its two-storied wings remained in almost perfect preservation, admirably restored by the late owner, Sir Louis Mallet. It might be dated at about 1370, with a long right-angled addition of Elizabeth's reign. In the same village is "Synyards," restored under the speaker's direction in 1905, where, a century or so later in date, was the same type of house, with alterations in Henry VIII's reign, in that of Queen Elizabeth, and in 1663, which, without detracting from the completeness of the original plan, had added greatly to its interest. "Stoneacre," in the same village, was a richer example of the same class of house; it awaited a sympathetic restorer. And in the same fortunate village were half a dozen other very interesting timber houses, some re-fronted in brick in the seventeenth or eighteenth centuries.

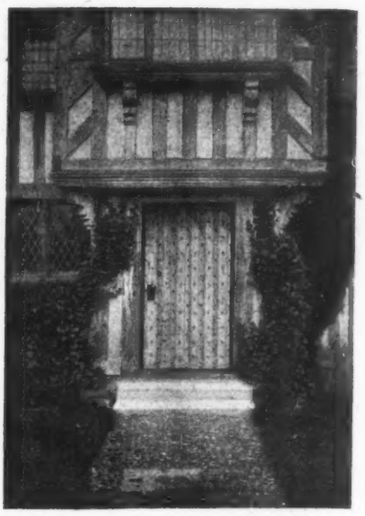
Harrietsham, Hollingbourne, Leeds, Langley —where was the great house of Rumwood, quite a mansion—afforded wonderful examples of half-timber architecture. These were all in the Maidstone neighbourhood; so also were the villages of Lenham and Malling, where other fine timber houses remained. The ancient half-timber gables at Ightham Mote and the Town House in the village of Ightham were well known. Another group was associated with the old towns of Sittingbourne, Milton Regis, and Faversham, in all the villages and hamlets

"Rumwood," Langley.

round which hundreds of these well-built and wonderfully preserved timber-framed houses might be found, as at Lynsted, Green Street, Teynham, Borden and Bredgar, Rodmersham and Newington, Milstead and Frinstead. Rochester and Chatham, Canterbury, Sandwich, Goudhurst, Cranbrook, Tenterden, Tonbridge, Chiddingstone, Westerham, Aylesford, and Dartford were storehouses for the student of timber architecture. So also in such villages as Wrotham, Eynsford, Orpington, St. Mary Cray—even in suburban Beckenham—were many fine timber houses of all sorts of plans, varying in date between the fourteenth and the seventeenth

The Old Malthouse, near Lynsted, Kent.

centuries. The early fourteenth century hall at Nurstead, Kent, with aisles and oak arcades, now sadly changed by mischievous alterations, was happily recorded for us in the admirable engravings in Parker's "Domestic Architecture of the Middle Ages." The outer walls were of stone, but the arcades were entirely of oak, and the germ of this plan was to be found up and down the country in the still numerous timber barns, divided into nave and aisles by the posts and trusses supporting the high-pitched roof. It seemed certain that the great lord's hall in the Saxon and Norman periods must have been

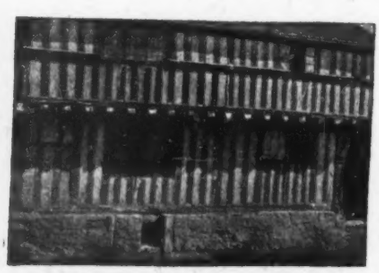


Porch, "Rumwood," Langley.

very commonly built of timber on the barn plan, and there yet remained, *mirabile dictu*, in a certain county one such pillared hall, all of native oak, with octagonal and circular columns, having Norman capitals, from which rose arched trusses. It would be inconvenient to call attention to this remarkable survival at the moment, but the speaker hoped before long to make its existence and whereabouts known to the antiquarian public.

All lovers of timber architecture owed a deep debt of gratitude to the late Mr. Ralph Nevill, F.S.A., F.R.I.B.A., who was perhaps the first to call attention in the columns of the *Builder*, and afterwards in his book, to the beauty and interest of the old half-timber cottages and houses of S.W. Surrey. They had also been charmingly recorded by Mr. and Mrs. Allingham, and by Mr. Batsford's admirable "Old Cottages and Farmhouses in Surrey." The speaker photographed many of these most beautiful old houses and cottages, to illustrate the topographical articles in the "Victoria History of Surrey" and for the "Schedule of Historical Monuments in Surrey," edited by himself and published by the Surrey County Council and the Surrey Archæological Society; but a vast number of mediæval timber buildings and others, ranging down to early Georgian days, awaited a more systematic record.

Then there were the old wooden halls and houses in remoter parts of Surrey, which nobody had put into books or archæological publications—such as Old Surrey Hall, or Blockfield, in Lingfield parish, dating from the fifteenth century and retaining its traceried oriel windows, and even miniature buttresses, of oak. Lingfield itself was a treasury of timber houses, including the well-known fifteenth century shop—a great rarity. So also was Crowhurst, with its magnificent moated manor-house, recently restored. The country around Ockley and Capel still abounded in farm-houses of timber construction, once lived in by substantial yeoman. One of these—"Taylor's"—had parts, including a rudely moulded screen, dating back to the early fourteenth



Village Street, Hollingbourne, Kent.

Pitstock Farmhouse.

Borden, Kent.

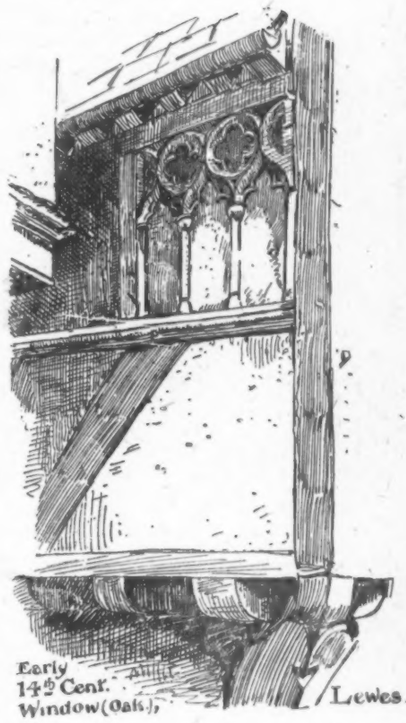
The Old Parsonage, West Tarring, Sussex.

century. This was in the heart of the oak forest country, till lately known but to the few. Other examples were Aldworth Farm, early sixteenth century; Bonet's, early seventeenth, Greene's, with timbered walls and roofs of late fourteenth and fifteenth centuries; Osbrook's, sixteenth and seventeenth; Ridge, Pleystowe, King's Farm, Boswell's Farm, Buckinghill, Misbrook, Holbrook's and Trout's (with sixteenth century inscription on a beam) and many other houses and cottages that had only been explored and recorded to a limited extent. A very picturesque illustrated account of some of these was published in the "English Illustrated Magazine," in 1889.

And this, after all, in only two parishes. Dunsfold, Chiddingfold—with its fifteenth century "Crown Inn," wherein is a fine king post roof—Alfold, Hambledon, Hascombe, Ewhurst, Cranleigh, Shamley Green, Bramley, Wonersh (in which is the old timber mansion of Great Tangley), Shere—a perfect Mecca in itself for students of old domestic architecture with pierced traceried barge-boards of fifteenth century date—Gomshall, Albury, Abinger, the Horsleys, and Clandons, the Bookhams, Shalford, Merrow, Witley, Cobham, and Compton: these were still very rich in half-timber buildings of all kinds and sizes. Ash, almost a suburb of Aldershot, and Worplesdon contained a number of timber-framed houses that had been little noticed, though of much interest to the architect. In the towns there was a rich store in Farnham, Haslemere, Godalming, Guildford, Woking, Reigate, Chobham, and Chertsey, worthy of the closest attention both as to structure and fittings. The Thames-side parts of Surrey, though naturally modernised and almost suburban, still retained quite a number of timber houses, as at Egham, Walton-on-Thames, Weybridge, Kingston, Richmond, Putney, Wimbledon, Merton, and Wandsworth. Turning south again, Leatherhead was rich in ancient examples (one with herring-bone brickwork in the panels of the timber framing, another with flints); so were Dorking and Epsom. In eastern Surrey, Charlwood, Betchworth, Horley, Blechingly, Godstone, Oxted, Carshalton, Beddington, Cheam and Croydon all presented interesting examples. In the old manor-house by Chaldon Church a roof and barge-board dated from the latter part of the thirteenth century. Even in the parishes now merged in London, such as Mitcham, Tooting, Streatham, Clapham, Camberwell, Newington, Southwark, Bermondsey and Rotherhithe were many timber-framed houses of great antiquity, masked by comparatively modern fronts.

Alfold, Surrey.

Sussex, taken as a whole, was also very rich in wooden houses—the east, perhaps, more than the west. The cottage, the farm-house, the manor-house, the streets of her towns and villages—such as Old Rye and wonderful Mayfield—were all represented in many types and all dates. The thirteenth century was represented by fragments in Chichester, Lewes (Anne of Cleeves' House), Winchelsea and Rye, as well as by the shell of the Old Rectory at Clayton; the fourteenth by the timber-built rectory at Sutton, near Bignor (where were to be seen Decorated windows of rich tracery in oak); Lewes—a corner house with a fine traceried window, *c.* 1310; and at Hastings another, perhaps of the end of the century, also in the side of a corner house in the Old Town. West Hoathly still preserved a clergy-house of the thirteenth or fourteenth century, with the original doorway having a pointed head cut out of two slabs that formed the butt-end of a large oak. The clay-plaster in this house, which had been rescued lately from a state of dilapidation, and now served as a village museum, was in excellent preservation. There were many fine timber roofs of this early period in Chichester, as in St. Mary's Hospital, the Grey Friars' Church, the Bishop's Palace, and the many old buildings in and around the



"Bexon," Bredgar, Kent.

"Bexon," Bredgar, Kent.

Ditchling, Sussex.

Dallington, Sussex.

Cathedral Close. The clergy-house at Alfriston was a very complete example of a hall-house of the second half of the fourteenth century, with double-storied ends and central hall, in which were preserved the original doorways and screen. The roof was thatched and probably always had been so covered. The village had many timber houses, including the fifteenth century "Star Inn." Parsonage Row, or the old Parsonage, at West Tarring, with its barge-board of tracery-work, was another good specimen of early half-timber construction, with a fine moulded breastsummer boldly bracketed out to carry the upper story and a recessed central hall in which was a projecting oriel. The doorways had 4-centred arches, and the roof retained its "healing" of Horsham slabs—a very picturesque form of roofing once as common as thatch in Sussex and Surrey, of which many examples were still to be found among churches and houses.

A very fine timber house (where Lloyd's Bank now stands) was pulled down about thirty years ago in Rye. It retained, in 1882, a good arched doorway with elaborately carved spandrels, and other interesting details. Rye still abounded in wooden houses, among which were the renowned "Mermaid Inn," the "Old Flushing Inn," and the very perfect Elizabethan Hospital, highly architectural in design. A small house in West-street had a front of ornamental timbers with curved quarterings and well-moulded windows of late sixteenth century date. All Saints-street, Hastings, had several quite elaborate timber houses of this date. The best were gone, but one or two with some good details remained, and also several with vast, steep-pointed roofs at least a century older. Not seldom these timber houses, like their stone brethren, were of more than one date. Anne of Cleves' House, Lewes, was an instance of this, the main building being thirteenth century, with a stone crypt of that date, while windows and a handsome stone fireplace were of Henry VIII's reign, and the left-hand wing with a back addition rather rich Elizabethan, retaining some noteworthy windows in that style. Perhaps the "Middle House" in the famous row at Mayfield, dating from 1575, was the richest example of this period, with its curved quarterings, quaintly carved barge-boards and beautifully moulded windows. This picturesque row rivalled the similar row on the village street at Chiddingstone, Kent.

There were also many wonderful old timber houses, such as those at Bignor, West Burton, Hardham, Pulborough, Billingshurst, Cocking, West Chiltington, Climping, Byworth, Petworth, Midhurst, Coombes. East Mascalls was a gem until its restoration—a Henry VIII house with later additions. Broadhurst had not been so spoiled. Also there was the lovely little moated house known as Ewhurst, in Ifield parish, near Crawley,—and the several charming half-timber houses of the fifteenth century at West Ham, near Pevensey.

Many of the photographs with which this lecture is illustrated were taken by Mr. P. M. Johnston, F.S.A., F.R.I.B.A., Mr. Ambrose Boyson, Jun., and others.

COMPETITION NEWS.

Southport.

Sir Reginald Blomfield, the assessor in the competition for a war memorial has awarded the premiums as follows:—

First premium (£250).—Messrs. Grayson & Barnish, Liverpool.

Second (£200).—Mr. Harold Falkner, Farnham.

Third (£150).—Messrs. Wilson & Jones, Berners-street, W.

Portishead.

The designs submitted by Mr. H. Stratton Davis, M.S.A., of 79, Northgate-street, Gloucester, have been placed first by the assessor, Mr. C. F. W. Dening, F.R.I.B.A. The second and third premiums were awarded to Mr. Percy Turner, A.R.I.B.A., 23, Bank-street, Bradford, and Messrs. J. C. Prestwich & Sons, Leigh, Lancs., respectively. Sixty-nine sets of drawings were submitted.

Labour-saving House Competition.

The premiums in the *Daily Mail* competition have been awarded as follows:—

First Premium (£250).—Mr. C. J. Kay.

Second Premium (£100).—Mr. G. Berkeley Wills, A.R.I.B.A.

Third Premium (£50).—Mr. E. W. Armstrong.

Further particulars and plans are given on pages 34 and 35.

Southport.

FOR THE EDUCATION COMMITTEE.—Designs for a secondary school. The sending-in day has been extended to February 7.

Haslingden.

FOR THE WAR MEMORIAL COMMITTEE.—Sending-in day, January 8.

Cottages at Church Gate Witley.

A PLEA FOR STREET ARCHITECTURE.

ARCHITECTURAL activities at the present time are roughly divided into two classes: commercial buildings and cottages. Since the Government is financing the latter class, it is, to a large degree, responsible for generally setting the standard, and suggesting the type of building which shall be erected. The standard, as regards accommodation, is compared to much of the previous work, and is a good one, but it would appear that sufficient discrimination is not being made between country and town districts. The policy is, in fact, the result of too much concentration upon garden-city ideals, without due regard to their appropriateness.

The garden-city type of house as it is known to-day, was in itself the result of a violent reaction against the dismal monotony of long interminable rows of dreary houses, ranged in endless uniformity, ornamented with tessellated abominations or with vile symbols of debased Gothic. But these houses for the most part rely for their effect upon a certain character of picturesqueness, which their designers have sought to emulate from mediæval examples surviving, more particularly, in the German towns, such as Rothenburg, Heidelburg, Hilderheim and Nuremburg. But picturesqueness—however great its charm—is most emphatically not an architectural quality, but something altogether extraneous, having its origin in certain fortuitous circumstances utterly unconnected with the architectural merit of the building. Thus, picturesqueness can never be more than incidental to good building. The garden-city type of development, with its semi-detached houses, its many gables, its arrangements of grouping, of closes, of *culs-de-sac*, is undoubtedly suitable under certain conditions, but if carried out with utter disregard as to the suitability of environment, it will be but the replacing of one monotony by another, of which the most that can be said is that the latter provides decidedly healthier conditions. But of good architecture much more must be demanded. If the garden-city enthusiasts be allowed full scope for their activities, there is a grave danger that the design of the street as a unified architectural conception will be utterly neglected and discountenanced.

The architectural charm which exists in most of our towns, both large and small, and which constitutes an endless source of pleasure to those who are susceptible to beauty in building, is to no little extent the result of infinite variety of forms in which the component building present themselves. And this variety is of a twofold origin. On the one hand, it is the result of the gradual deposit of the successive ages, and on the other, of the versatility of contemporaneous activities working in completely unfettered and unrestricted independence of each other. To-day, however, the situation is changed, the policy, although by no means controlled, is guided by a central authority, and moreover by an authority which does not seem to regard with much sympathy any designs which do not conform to the garden-city ideals.

Never was there a more erroneous supposition than the one which seems to exist to-day, that every man requires the partial exclusion such as can only be offered to him by the semi-detached house standing in its own plot of land: that he is no longer concerned with the pleasure of the broad-flagged pavement, upon which he can hear the beat of his own footsteps, with the light in the shop window, with the gossip of the street, with, indeed, the congeniality of friendly intercourse in hours of leisure such as can only be provided by a house having direct access to the street. Such a house does not seek the protection of the forecourt and the gravelled path approach; adjuncts which are certainly not desired by every tenant. It is platitudinous to speak of the diversity of human nature, but those who would have all houses built to one model seem unaware of the existence of such an elementary fact.

15th Century House, Bignor, Sussex, with panels of plaster, flints and brick.

In almost every village of even the most modest dimensions is to be found a main street: the High street as it is usually called, the original nucleus, around which development has taken place. It is a street not composed of semi-detached villas, nor designed on the rigorously scientific lines which would seek to separate the "dwelling-houses" from the "shopping-centre," but rather a delightful heterogeneous growth, with here and there a shop front of exquisite design to allure the unwary customer. To live in this street—the centre of local activity—many are willing to forego the greater seclusion which this latest form of development offers. It is only necessary to think of the small towns in Somersetshire, Warwickshire and Bedfordshire—the latter county containing some of the most beautifully designed shop fronts in the whole of England—in order to realise, how differently the same subject has been treated in different ages and localities. Conceive then, the inestimable loss to our national architecture if all such streets were ultimately to yield to the designer of garden cities.

There can be no reason why some of the housing schemes, which are now being carried out, should not provide for development on these same successful lines, conforming, however, to the newest standards in connection with internal planning and equipment, by prolonging the perspective view of the High-street with a single block, of say some half-dozen houses, their warm brick work, white paint and long unbroken cornice, harmonising ever so pleasantly with the existing work.

The justification for this plea becomes even greater in the case of the town, for even here the garden city enthusiast stubbornly and unreasonably upholds his objection both to the tenement or flat dwelling and to development by means of the terrace. Blocks of four houses he will tolerate, and he will even occasionally consent to a block of six, but there, quite illogically, his concessions end. It would be better had he inherited some of the perspicacity which characterised his ancestor of some hundred years ago, whose contribution towards the solution of the somewhat similar housing problem of his day remains with us yet, in the shape of the many squares, which constitute a never-ending source of delight both to the Londoner and to the traveller. It might indeed have been hoped that these squares, maintaining, as they do, their original character, would have influenced contemporary taste towards an emulation of the simple dignity, so suitable to their purpose, which they express with such eloquence.

It may be demurred that the present demand is for a much smaller type of house than is to be found in the average London square. There are, however, excellent examples of squares, containing houses of just the sizes which are to-day so urgently required. Edwardes-square is a perfect example of a spacious London square, containing houses, which, eliminating the basement, are of just the needed size. The demand for an adequate open space is met by the large central garden, which is possibly a more appropriate method of satisfying it, in the case of a city, than the ubiquitous forecourt and back garden. Each side of the square is treated under one roof as a complete architectural unit. There can be no reason, beyond insular prejudice, why a similar treatment should not be extended to flat and tenement dwellings. This must not be interpreted as a suggestion that the problem of the twentieth century is only to be solved by imitating the work of the eighteenth and nineteenth, good as this is universally admitted to be, for each period and district has its own particular and indigenous difficulties which require their individual solution, but rather that development should take place along traditional lines, satisfactory to the particular local requirements.

It will be objected that at the present time, owing to the high cost of road construction, the expense of developing on lines which utilise only half the available frontage is prohibitive. A reply to this criticism is that there are other classes besides the artisan classes who desire housing accommodation, and who are moreover willing to pay an economic rent. Admitting, however, that development by means of the square must be the pleasant exception rather than the rule in large towns, there can be no adequate objection to building houses in terraces, provided that each house has sufficient frontage to enable it to dispense with the unhealthy back projection, and sufficient space both at the back and front to obtain enough sunlight and air.

Certain it is that the housing problem will not be properly solved unless the official mind evinces a greater flexibility in dealing with the matter. For unless some change occurs, fragments of garden-cities will spring up in and around every town and every village, and building will encroach with alarming rapidity upon land which should be preserved for other purposes. It has been truly said that in architecture may be read the history of a nation, and we look back now and see in the architecture of the middle period of the last century the evidence of the soulless outlook of that great commercial and industrial age. Let not posterity read in our present efforts the lamentable results of excessive bureaucratic control, but rather of a great and versatile Empire, courageously handling the stupendous task of reconstruction.

CITIES OF OLD SPAIN—II.

TOLEDO—THE CITY OF THE CHRISTIANS.

BY SELWYN BRINTON, M.A.

In the first of these articles (January 3, 1919) we considered Toledo as a Moorish city, and studied those fascinating survivals of Moorish art which, as I then pointed out, make this old city such a valuable introduction to the art of the Palaces of the Alcazar of Seville and the Alhambra at Granada. We have now to consider Toledo as a Christian city; and I will venture to assert that from this point of view her architecture will be found of no less value and interest.

The end of the Moorish power in Toledo came but a few years after the fall of the Saxon kings in England before the Norman conqueror; both these events mark the victorious advance of the feudal chivalry of Europe against a looser and less efficient organism. In 1085, Alfonso VI, King of Leon, entered Toledo with his Christian knights, upon Sunday, May 25, passing, as we have seen, the old Mosque of Bib-el-Mardóm, now the Church of the Christ of Light. His treatment of the conquered city was as generous and politic as had been that of the Moors under Tarik and Musa. The Jews, Mussulmans and foreigners continued subject to their own codes and tribunals; but, as Mr. Calvert points out "while the Mozarabe, or native, of Toledo clung to the old Fuero Juego, or Visigothic law inherited from his fathers, the Castilian and Leonese expected to be ruled according to the rougher, ruder code of their warrior counts and kings. . . . Each had an Alcalde of its own, subject, however, to the Alcalde Mayor, named by the King," while another important concession was that the Muslim subjects of Alfonso in Toledo should have the free and exclusive use of their own Mosques.

Among the numerous churches which soon came to be built in Toledo, now the capital of this new Spain, and—as she still is to this day—the Metropolitan See of the Catholic Church in that country, there are three to which I shall devote especial attention. These are: the great votive church of San Juan de los Reyes, the Cathedral of Toledo, and the noble Hospital of Santa Cruz, now being transformed into a museum worthy of the old city.

The great Franciscan church of San Juan de los Reyes was commenced in 1476 by Ferdinand and Isabella, and dedicated to the Apostle St. John, in thanksgiving for their victory at Toro over the Portuguese. It was originally destined to be a mausoleum for the Kings of Spain, then taking her place among the great European States: but the conquest of Granada gave that city a superior claim to this honour, although San Juan was decorated with the rusty chains which had once held Christian captives within Moorish dungeons. The result of these changes of programme is a church magnificently planned and commenced, but incomplete—or completed to its loss within a later age; but even so, as a specimen of late Spanish Gothic art it deserves our study, and almost merits the praise of Theóphile Gauthier, although we may question the accuracy of his criticism when he said that "Gothic Art had produced nothing more suave, more elegant, more fine." The interior of the church is composed of a single nave with side chapels, and at the junction of nave and transept is an octagonal cupola resting on four pillars. The altar, with a fine *Retablo*, belongs to the later Renaissance period, but the attraction of the whole building is the profusion of Gothic tracery and carving which covers galleries, pillars and walls. Among the heraldic devices the eagle, symbol of St. John the Evangelist, and the initials, devices and coats-of arms of the Catholic Sovereigns—"Los Reyes," Ferdinand and Isabella—continually reappear; and one feels that had the church been completed on the lines originally planned it would have been a marvellous example of the later and somewhat florid Spanish Gothic.

The Convent of the Franciscan monks attached to it was mercilessly pillaged by the French invaders in 1808—who used the church just described as a stable—and has been converted into a provincial museum; but the cloisters of San Juan escaped unscathed, and have now been effectively restored at very great expense. The accompanying illustration will give some idea of the beauty and richness of these cloisters. Restoration in these cases is generally a doubtful blessing, because, however careful and accurate, it must destroy the texture or *patina* of the old stone work; but the cloisters, as they stand, are marvellously rich in detail and beautiful in design, and quite undeserving of the strictures of Murray's Guide-Book, which says of this restoration: "The work has been barbarously performed, and the cloisters now look like a wedding cake."

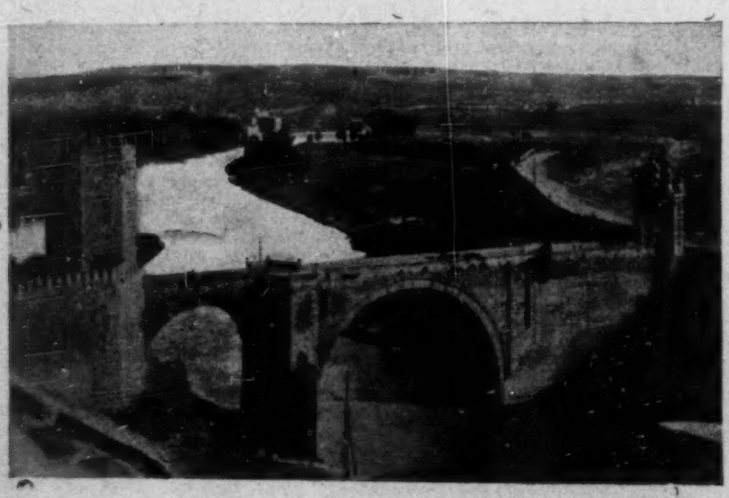
When Toledo became Christian and the capital of Catholic Spain, it was felt—and, I think, rightly—that its Cathedral Church should be entirely independent of those Moorish influences from which, however attractive, the country was even then freeing itself. The Cathedral of Toledo is Gothic and "may be said to embody the ideals of Old Spain—of the young fighting nation who looked forward";

Tower and Street of Santa Magdalena, Toledo.

and being Gothic it seems more than likely that a French architect—probably Pierre le Pierre—was employed on the first design of the building, which took from 1270–1425 to complete. The centre of this vast Cathedral, which is unequalled in Spain, is occupied by the choir, enclosed by walls and cloisters, and at one side by its magnificent *reja*; and in this enclosure, which surrounds the choir, we may trace out the influence of all styles, from the earlier and later Gothic to the late Barocco or Churrigueresque of the seventeenth century, in the famous and much-criticised *Transparente*.

The choir within is one of the wonders of Spanish religious art, enriched by a screen, lecterns and stalls; and the screen itself, carried on fifty-two columns of jasper and marble, encloses the choir on the three sides. The stalls of Toledo Cathedral have been well described as triumphs of the carver's art. The under stalls, carved in 1495 by Maestro Rodrigo, represent the campaigns of Ferdinand and Isabella against Granada, and among these scenes of medieval battle—one of which is included among the illustrations—appears the surrender of the Alhambra. The upper tier of stalls, in walnut wood with single figures of Saints, carved half a century later by Berrugurete and Vigarny, form an admirable contrast to these last. The inscription referring to these two great craftsmen tells us that then their genius was here in rivalry, as will later be opposed the judgment of spectators—"*Certaverunt tum arti cum ingenia: certabunt semper spectatorum judicia.*"

What we feel is that in these fifty succeeding years the genius of the Renaissance had penetrated to Spanish Art, and expressed itself—in contra-distinction to those earlier scenes of Moorish warfare—with greater simplicity of treatment, and a delicacy and subtle skill of modelling which would be worthy of Cellini himself. There are thirty-five of these seats by the Spanish Master, and thirty-six by his Burgundian rival, Philip Vigarny. The seats themselves are separated by marble columns of red jasper, and near them in the centre of the choir are the great reading desks of gilded bronze, with friezes from the Bible story in relief by Nicholas de Vergara and his son,



Alcántara Bridge, Toledo.

Doorway to Cloisters, Toledo Cathedral.

and the magnificent brass lectern (1646) upheld by a great eagle with outspread wings.

From the choir we pass to the High Chapel or Capilla Mayor, which occupies the eastern end of the nave. In front of this is the superb railing, corresponding to and contemporary with that of the choir; which screens off the splendour of the chapel itself, whose magnificent *Retablo* rising to the roof is one of the glories of the Cathedral. Here, again, Philip Vigarny was at work, assisted, however, by his brother and other masters. This *Retablo* is of wood elaborately decorated, gilded and crowded with figures, the whole being crowned by a colossal Crucifix. Around the High Altar, placed in Gothic recesses, are the Royal tombs, and to its left "the sepulchre more glorious than those of any kings," of the great Cardinal Mendoza, erected by order of Isabel the Catholic.

Behind the High Altar is the famous *Transparente*, a Baroque work of the eighteenth century, designed at that time by Narcisco Tomé, whom Murray calls "the heresiarch of the Churrigueresque." Created in violation of all the beautiful Gothic detail and sentiment of this interior it is impossible to defend it, and at the same time impossible not to admire its audacity. I have previously noted the tendency of Lorenzo Bernini and his followers to introduce theatrical effects of lighting into their sculpture. It is evident that to get his effect the architect Tomé deliberately cut away part of the Gothic screen in order to bring a strong top-light upon his figures. To conceal what he had done he placed around this window certain figures painted and modelled in stucco, which are artistically indefensible; but the result, especially as seen in the morning light, of the marble screen which encloses this end of the High Altar is extraordinarily brilliant. It has been condemned, very naturally and very properly, by English admirers of the Gothic; and Murray alludes to "this fricassee of marble in which the plunging figure of San Rafael is prominent with his legs kicking above him in the air." But the marvel is that it really does not clash more violently than it does with the fine Gothic work into which it was recklessly and unjustifiably introduced; and the reader will be able, from the illustration given, to judge of this, and of the really high technical skill of the sculpture—entirely Baroque in its sentiment—which was introduced, whose vandalism we must condemn, whose brilliant audacity one may be permitted to admire.

It would far exceed the limits of this article if I were to describe in detail the many chapels—the Chapel of San Ildefonso, the Capilla de Santiago, that of Santa Leocadia, the Capilla de los Reyes Nuevos, the Capilla de la Trinidad, the Chapel of San Juan, or of the Canons, and of Teresa de Haro—which surround the great Cathedral and add to its beauty. I will only mention the Chapter House, or Sala Capitular, with its wonderful *artesonado* ceiling, the Sacristy, with its paintings by Greco and Goya, and a ceiling painted in fresco by Luca Giordano, and the Chapel of San Juan which is the store house of the Cathedral Treasure.

The riches contained, in the shape of goldsmith's work and actual precious stones within this one small room of Toledo Cathedral, almost surpass belief. We must remember that the New World was mercilessly pillaged by its first Castilian conquerors; and that Toledo Cathedral, as the Metropolitan Church of Spain, probably had the pick of the loot. Its climax is reached in the mantle of the "Virgin del Sagrario," which is probably the most costly piece of embroidery which exists in the world. Its material is twelve yards of cloth of silver, covered with gold, and stiff with pearls and other precious jewels. In its centre is an ornament of amethyst and diamonds, and among the other jewels which are introduced at intervals round the mantle appear emeralds and rubies of great size, and priceless value, while around its border are rows of large pearls. This is only one among many pieces of elaborate jewelled embroidery within the Treasury. The most important piece of goldsmith's work is the "*Custodia*" or Shrine, in the form of a Gothic Temple eight feet high, and containing no less than two hundred and sixty statues, all finely carved; within this tabernacle the "*Viril*," from which the Host is displayed, had been made from the first gold brought back from the New World—that gold that was to give Spain such immense riches, and to prove perhaps the very source of her later decay.

The vestments of Toledo Cathedral, belonging mostly to the XVth and XVIth centuries, are in the Sagristia; without of course realising the money value of the jewels they form probably the finest collection of vestments in the world. There are forty complete sets, each set containing a Chasuble, a dalmatic, cope, altar frontal, and other small pieces.

Lastly, as we leave the Cathedral, the cloisters—cool, spacious and silent with that wonderful silence of these old Spanish cities—filled in their central space with delightful greenery, and decorated on their side walls with really fine frescoes by Francisco Bayeu, Goya's brother-in-law and master, form our last recollection of this wonderful Cathedral, unique in Spain and in the world.

The last building which I propose to mention is the Hospital of Santa Cruz (Holy Cross), built between 1494 and 1514, and designed by its founder, Cardinal Mendoza, as a hospital for foundlings. This building is constructed on a vast scale and in the Renaissance style; its design and carvings being due to Enrique de Egas of Brussels. In style it really represents a transition from the florid later Spanish Gothic to the Renaissance; and the richness of the carvings in a creamy white stone is very remarkable.

To be admired above all, is the superb portal which meets us as we enter the enclosure, having passed under the Moorish arch of the Zocodover. This doorway is covered with beautiful reliefs representing, amid a maze of delicate ornament, the Adoration of the Cross by St. Helena, the Espousals of St. Joachim and St. Anna, the four Cardinal Virtues, and the figures of St. Peter, St. Paul, and of the founder himself, Cardinal Mendoza, with two pages bearing the mitre and helmet of this great warrior prelate.

Within we find a building cool, spacious, and admirably designed, with a vast *patio* or central courtyard, surrounded by a double arcaded gallery with marble columns. The chapel itself in the form of a cross is of vast dimensions, and the wide arches contrast with the Moorish horseshoe design and with the pointed Gothic, giving a sense of immeasurable spaciousness and dignity. The inner doorway, almost as rich in its carving as the outer portal but of black marble, and the fine ceiling within of *artesonado* design are points to be noted; while on the upper floor of the building itself on the other side of the patio and chapel there are hundreds of bedrooms, now restored and available for use if needed.

This simple fact will perhaps convey to the reader some idea of the vast and lavish scale on which this great hospital was designed by the Cardinal, its founder. After having been allowed to fall into some decay it is now being carefully restored, with a view of forming there a great museum for the City of Toledo which should include not only paintings, but sculpture, objects of historical interest and a fine library. The idea is an excellent one, and the building and site—fully accessible, yet just without the main square of the city and commanding a magnificent panoramic view over the surrounding country—could not be surpassed; it is only to be hoped that the restoration, which has now been in progress for several years and is expected, as I am told, to take some

Detail of Choir Stalls in Toledo Cathedral.
(Ferdinand and his Knights attacking Granada).

twelve years longer, will follow faithfully the lines of this grand old building, and preserve, without altering in any way (which would be a fatal and fundamental mistake) its original character.

If this is done I believe that Toledo will acquire in her new museum an asset of the greatest artistic as well as financial importance; though what use she is to make of the hundreds of available bedrooms, which would accommodate a small army of custodians, I will not attempt here to discuss.

For Toledo, "the crown of Spain, the light of the whole world, free from the time of the mighty Goths"—as she was described by one of her own citizens—is essentially an art city, and a city of the past. She is no longer a capital, and—perhaps happily for us—has left to Madrid the noise, the dust, the crowd, the smart shops and the aspect of modernity which are a feature of that brilliant but very exhausting capital. Toledo, wiser and perhaps happier, sits enthroned above her mighty river, girdled by her circling walls and old Moorish towers—and dreams of her ancient and immemorial grandeur. But it is as a great art city that she can and ought to live; and this aspect of her life should prove both a fruitful source of interest to the world without and of revenue to herself.

It is from this point of view that such a museum as could be afforded by this wonderful "locale" of the Hospital of Santa Cruz, which could be made not merely a provincial museum—such as Toledo already possesses—but one of the greatest museums of the world, is of incalculable value and importance; and it will be my object, if this and the preceding article should appear in the form which I propose within the pages of the *Builder*—to take care that this suggestion is brought directly before the notice of the authorities within this wonderful city of old Spain. For Toledo, which I have now described, both a year ago in her Moorish, and now in her equally wonderful Christian buildings, is one of the great art cities of the world, as individual as Siena in her intimate appeal, and as unspoilt hitherto by the worser influences of modernity.

I visited her, and wrote these notes, which I now conclude, when the whole frame of Europe was convulsed by war; and in those days she seemed to me a haven of peace, haunted by beautiful old memories.

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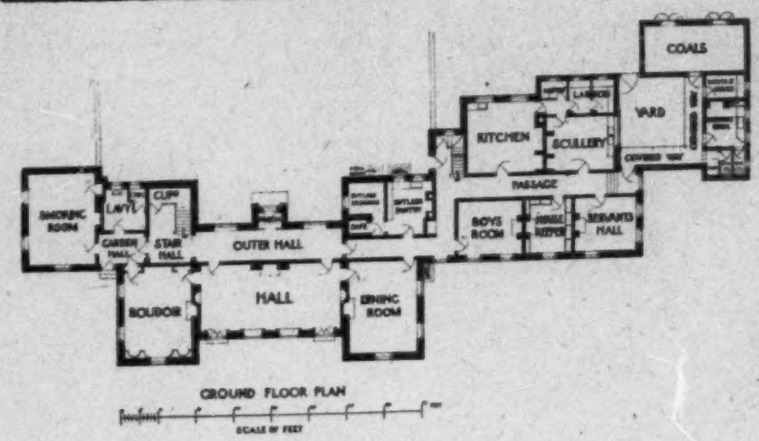

Sion Hill, Thirsk, Yorks.

MR. WALTER E. BRIERLEY, F.S.A., Architect.

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Patio of the Hospital of Santa Cruz, Toledo.

ILLUSTRATIONS.

"The Builder" Calendar.

With this issue we give our usual calendar The subject illustrated this year is old Wych-street, from a water-colour drawing by Sir Ernest George, A.R.A. Some notes on old Wych-street and the surrounding neighbourhood are given on another page.

Office Buildings in the City.

The interior shows the treatment of the entrance hall for a large block of offices in the City. It will be in stone and bronze as shown upon the drawing, with gallery to the first floor. The architect is Mr. Edwin Cooper, F.R.I.B.A.

The New Westminster Hospital, Clapham Common.

This hospital, which is to be erected on the north side of Clapham Common, is designed for 525 beds. The existing building frontage lines on the south side have been retained, thus allowing of a strip of garden between the ends of the wards on this side and the public road. The blocks have been designed so as to obtain the maximum of sun and air, and the plan has been arranged to allow of easy administration. All the blocks are reached on both sides from one main central corridor, and all the administrative offices are arranged midway between the floor pavilions. In the central block, the secretarial offices and board-room, matron's offices, linen-rooms, chapel, visiting medical staff rooms and students' waiting-rooms, are on the ground floor; on the first floor are the resident medical officers' sitting and bedrooms and the dining-room for nurses. The servants' bedrooms and the kitchen, to serve the whole hospital, are on the top floor. The out-patients' department, on the ground floor of the north-east pavilion, consists of waiting-hall for 250 patients, six consulting rooms, operating theatre and other rooms. On the ground floor of the south-east pavilion is the casualty department, consisting of surgeries for males and females, medical officers' and sisters' rooms, small isolation wards and waiting-room. The electrical and massage departments, special bathrooms, gymnasium, &c., are on the lower ground floor, below the casualty department. The boiler-house and engine-rooms are in the basement under the out-patients' department, all pipes and mains being in a subway under the main corridor.

The ward pavilions are 80 ft. apart, and placed almost axially north and south. The pavilions are three stories high, each floor containing twenty-four beds, with ward kitchen, sisters' room, test-room, linen-room, milk larder, patients' clothes-room, bathroom, and usual sanitary offices. Each pavilion has a large balcony facing south and a fire exit at each end.

The flat fire-proof roofs can be used as open-air wards. All corridors are well lighted and the cross corridors have an end window. The four operating theatres have due north and top lighting. Provision has been made for a large medical school and in the future for a nurses' home.

Messrs. H. Percy Adams and Charles H. Holden are the architects.

A National Memorial.

We give this week two illustrations recently shown by Mr. C. Stanley Peach, F.R.I.B.A., at the Royal Academy War Memorial Exhibition, and in our next issue we hope to give some particulars of his suggestions. On another page Mr. Peach puts forward some considerations upon which the decision as to a national memorial must depend.

Victory House, Kingsway.

This building is designed to provide additional accommodation for the offices of the Public Trustee.

The general contractors are Messrs. W. F. Blay, Ltd., of Dowgate Hill, London, E.C., and Dartford. The front is in Portland stone by Messrs. Wallis, of Maidstone, with metal windows by Messrs. Williams & Williams. The structural steel is by Messrs. Dorman, Long & Co., and designed by Mr. H. F. Smith, consulting engineer, Harrow. The building has two electric passenger lifts by Medways; the floors are by Diespeker. The entrance hall is in marble, for which the contractors are Messrs. Carter & Co., Ltd.; who are also tiling the staircases and lavatories. The heating and hot water supply is by Messrs. Z. D. Berry & Son, Westminster, to the design of Mr. A. H. Barker. The cast-iron work is being executed by Messrs. Wilmer & Son, and the artificial stone staircases by Messrs. Malcolm McLeod; the lantern lights are being executed by Messrs. Luxfer, of 16, Hill-street, E.C.2.

The building occupies the centre of a mass of buildings of varying design, and is somewhat higher than the adjoining buildings. The whole building was conceived after the Armistice and has already nearly approached the roofing stage.

The architects are Messrs. Trehearne & Norman, of 68, Lincoln's Inn Fields, W.C.2.

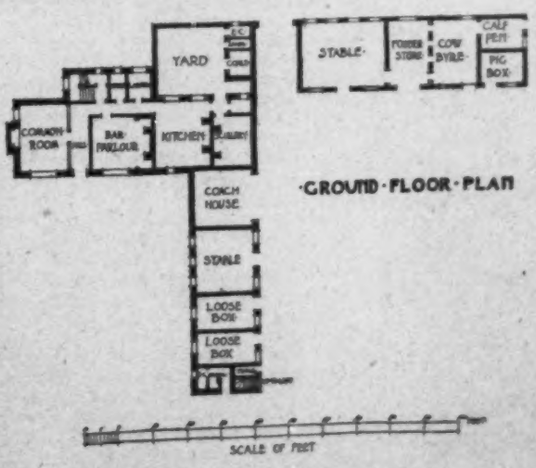
Princes House, Kingsway.

This is an office building, and is designed with its main lines to take its proper place as part of a general composition of street architecture amongst the neighbouring buildings.

The general contractors are Messrs. W. F. Blay, Ltd., of Dowgate-hill, London, E.C., and Dartford. The front is in Portland stone by the United Stone Firms, Ltd., with metal windows by Messrs. Humphries, Jackson & Ambler, Ltd. The structural steel is by Messrs. Drew, Bear, Perks & Co., Ltd. The building has two electric passenger lifts by Messrs. Marryatt & Scott. The floors are by Diespeker. The entrance hall will be lined with marble by Messrs. Farmer & Brindley. Tiling to staircase and lavatories is by Messrs. W. B. Simpson & Sons. The cast-iron work is being executed by Messrs. Wilmer & Son, and the artificial stone staircases by Messrs. Malcolm McLeod, while the lantern lights are being executed by Messrs. Luxfer, of 16, Hill-street, E.C.2. Mr. H. F. Smith, of Harrow, is consulting engineer for constructional steel, and Mr. A. H. Barker for heating and hot water.

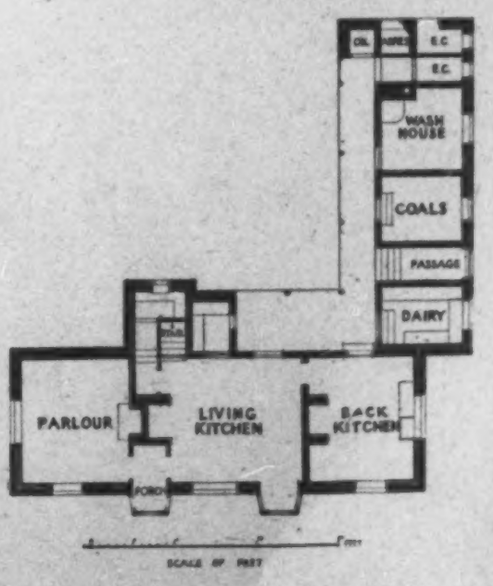
The architects are Messrs. Trehearne & Norman, of 68, Lincoln Inn Fields, W.C.2.

Staircase and Outer Hall, Sion Hill, Thirsk, Yorks.
MR. WALTER H. BRIERLEY, F.S.A., Architect.



GROUND FLOOR PLAN

Blue Bell Inn, Ingleby Cross, Yorks.



Coney Hills Farm, Gilling, Yorks.

MR. WALTER H. BRIERLEY, F.S.A., Architect.

Sion Hill, Yorkshire.

This house was erected in 1912 for Mr. Percy Stancliffe on the site of a house erected about one hundred years ago, which has been pulled down to make way for it. The estate, until recently, belonged to a branch of Lord Harewood's family, and is about four miles from Thirsk, in a richly wooded neighbourhood, through which the river Wiske winds. The new house is planned so that the principal rooms all get as much sunshine as possible and face the gardens and river, and several of the windows command fine views of the Vale of York and the Hambleton Hills. The house is built with 20 in. thick cavity walls, the outer facing being of 2 in. thick, red, hand-made bricks, and the roofs are covered with thick, red, hand-made, sand-faced tiles. The entrance porch is of Portland stone, which is also used sparingly for window-sills, strings, etc. The interior is treated in a simple but effective manner. The architect is Mr. Walter H. Brierley, of York, and the builder Mr. Thomas Lumsden, of Newcastle.

We shall give further illustrations of the house in a subsequent issue.

Farm House and Cottages at Gilling, Yorkshire.

This farmhouse and cottage were erected in 1917 for Mr. W. S. Hunter, of Gilling Castle. They are built of local stone and roofed with Yorkshire pantiles. Mr. Wm. Anelay, of Docken Hill, Doncaster, was the contractor for the farmhouses, and the cottages were erected by the estate workmen.

Mr. Walter H. Brierley, of York, was the architect.

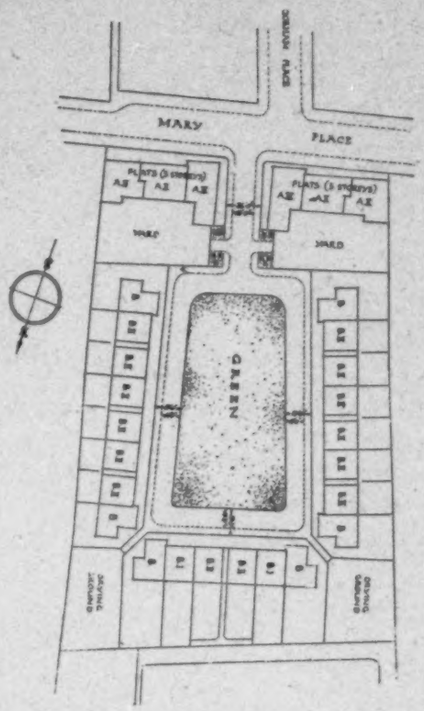
Blue Bell Inn, Ingleby.

This inn was erected for Sir Hugh Bell, and is situated at Ingleby Cross, in the North Riding of Yorkshire, and lies on the east side of the main road between Thirsk and Yarm, in delightful country at the foot of the Cleveland Hills. The buildings are so planned that the rooms for the travellers and innkeeper catch the best of the day's sun, and with stabling forming a fore-court sheltered from the north and east winds, which sweep this countryside in winter. The ground floor provides a common room with an ingled fire, a bar parlour, and the innkeeper's living-rooms, and the first floor provides a large room for meetings, rent days, &c. There is ample stable accommodation. The elevations have been simply treated, the walls being of local stone and the roofs covered with rich, red, hand-made pantiles; the whole has already weathered into its natural setting. The work was carried out by Mr. J. T. Tarran, of Enterpen, and Mr. Walter H. Brierley, of York, was the architect.

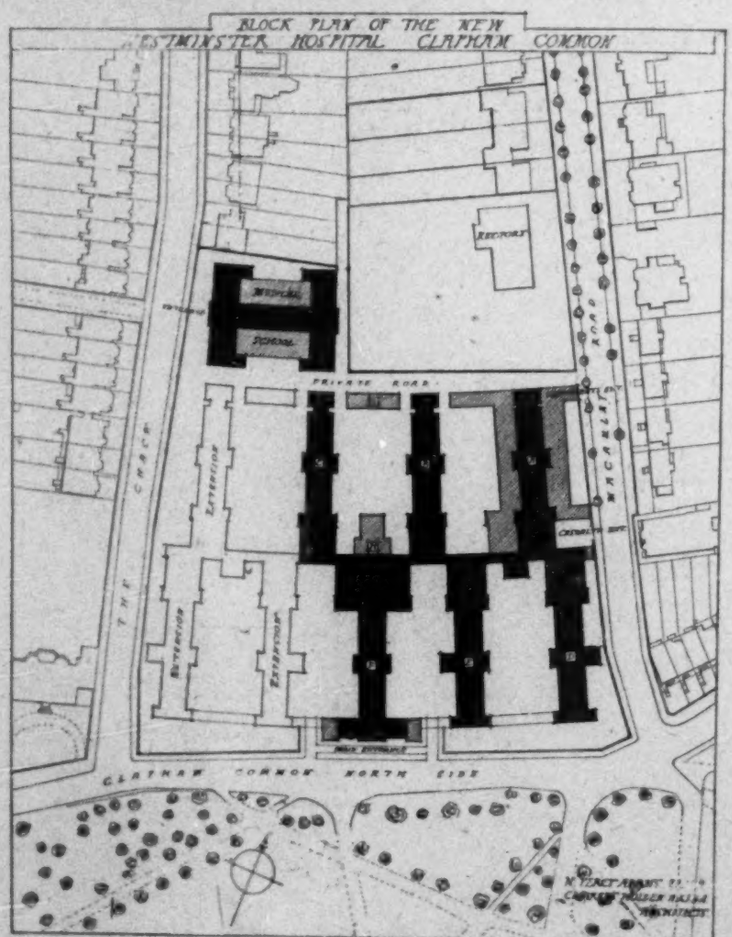
Kensington (Mary-place) Housing Scheme.

The cottages have been designed in accordance with the principles laid down by the Ministry of Health. The number of cottages was fixed by the Council, the approximate frontage of each being thus determined. Owing to the confined nature of the site, back projections were undesirable, and the necessity of economy demanded that the treatment of the elevations should be as simple as possible.

The price per cube foot is based on the assumption that a large quantity of material will be available when the site is cleared, the existing buildings being well built and comparatively modern. The flats have been planned to utilise the south aspect for as many rooms as possible, the balcony type of plan being adopted partly for this reason and partly because the frontage available permitted of three flats being provided on each floor, direct access to which from one staircase would have been difficult to arrange, due regard being paid to ventilation and economy in drainage. The design, by Mr. Arch. S. Soutar, was selected in a recent competition limited to four.



Borough of Kensington Housing Scheme.
MR. A. S. SOUTAR, architect.



MESSRS. H. PERCY ADAMS, F.R.I.B.A., and CHARLES HOLDEN, A.R.I.B.A., Architects.

Offices of the Crown Agents for the Colonies.

We give this week a view, from a photograph, specially taken for the *Builder*, of the Offices of the Crown Agents for the Colonies, Millbank, designed by Messrs. J. W. Simpson & Maxwell Ayrton. In our next issue we shall give illustrations of the Western Annexe of the building.

A War Memorial.

In these days, when so many people are considering the most suitable way of commemorating the great sacrifices which the world war has brought to many homes, the accompanying drawings may be of interest. The design illustrates a portion of the war memorial scheme promoted by the Old Millhilliana.

In considering the nature of the proposed memorial, the Committe decided to apportion the fund towards the erection of a new Science Building, and a monument in memory of those who have so worthily served their country. In the latter, the idea of a Gate of Honour, to be used in special ceremonies in the school life, was the one which appealed most strongly to the Committee.

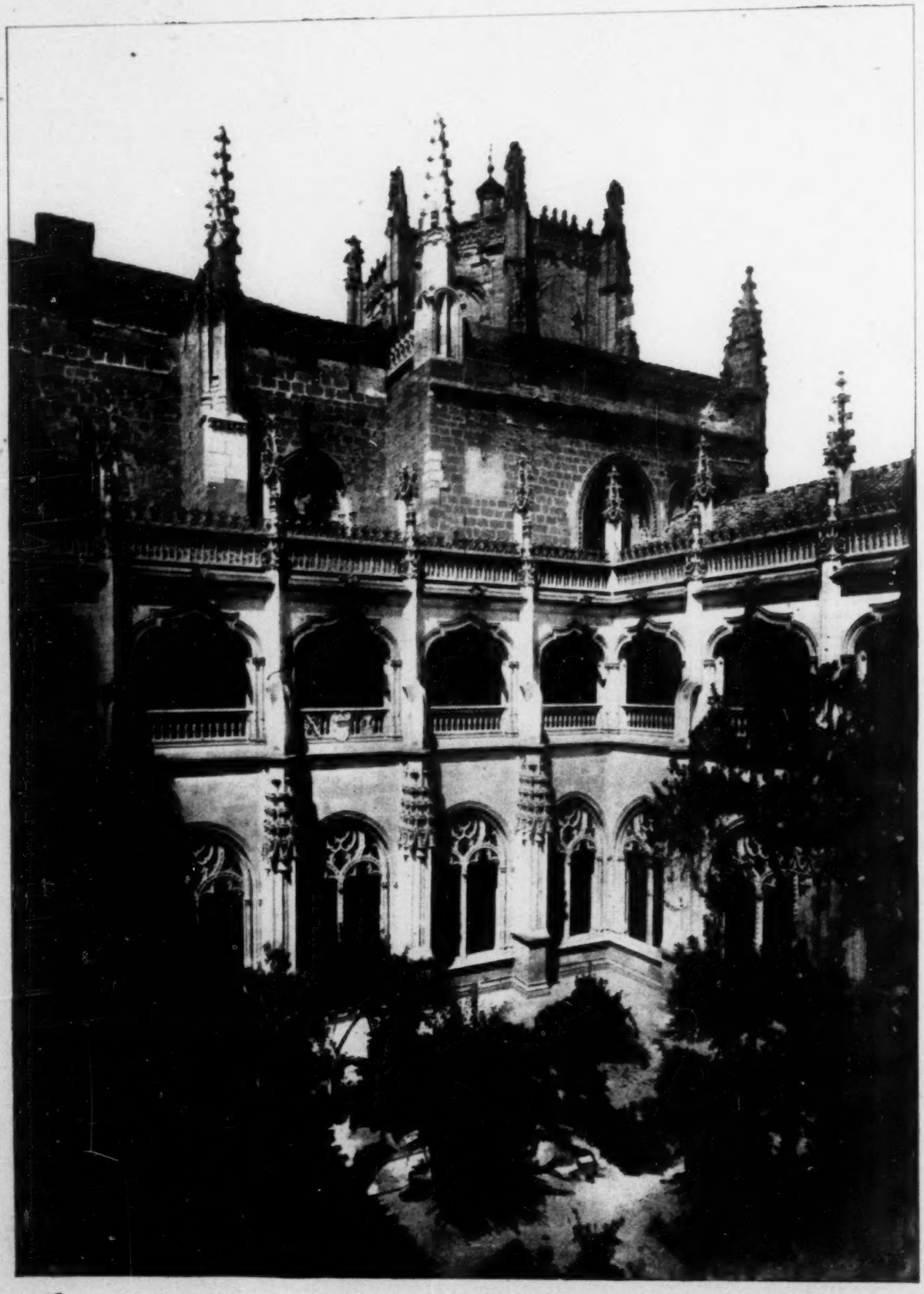
The nature of the existing school buildings determined the character of the design, which is purposely simple and refined, all suggestion of incorporating sculpture, alas! so often found in the modern war memorials, has been rigorously opposed, the intention being that the monument should express an idea rather than any detail of circumstance.

The monument is to be built in Portland stone, with a coffered panelled ceiling of cedar wood. The gates will be bronze, and arranged to slide into the thickness of the stonework. There will be a short inscription carved on the frieze of the entablature. The names will be recorded on the panels within the memorial, and will be carved in the stone alphabetically, the names of those who have fallen being gilded.

The design is the work of Mr. Stanley Hamp, of Messrs. Collcutt & Hamp, architects, 36, Bloomsbury-square, W.C.

Toledo Architecture.

These illustrations are given in connection with the article on page 14.



CLOISTERS OF SAN JUAN DE LOS REYES, TOLEDO.

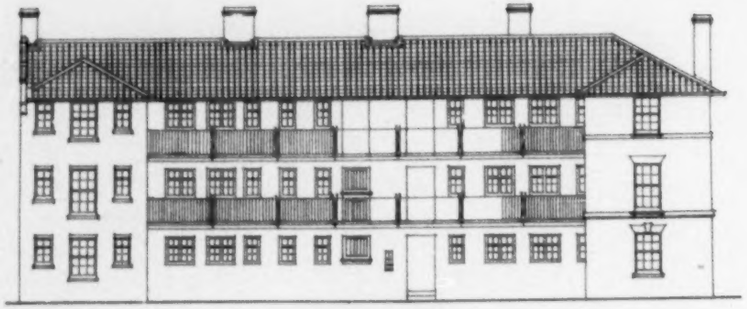
OFFICES OF THE CROWN AGENTS FOR THE COLONIES, WESTMINSTER.

MESSRS. J. W. SIMPSON AND MAXWELL AYRTON, ARCHITECTS.

ROYAL BOROUGH OF KENSINGTON
FLATS MARY PLACE

SCALE OF FEET

LIST OF ABBREVIATIONS			MATERIALS		CUBINGS
L.R.	denotes	LIVING ROOM	ROOFS	Bridgewater Tiles	108440 cu. feet at 10d per cu. foot = £4535 for the block of 9 flats
B.R.	"	BEDROOM	WALLS	Black brick facings	
Scy	"	SCULLERY	FLOORS	Coke breeze concrete & steel joists covered with 1" floor boards	
L	"	LARDER			
C	"	COAL PLACE			
Cpd	"	CUPBOARD			
(B)	"	AREA OF ROOM (in ft)			



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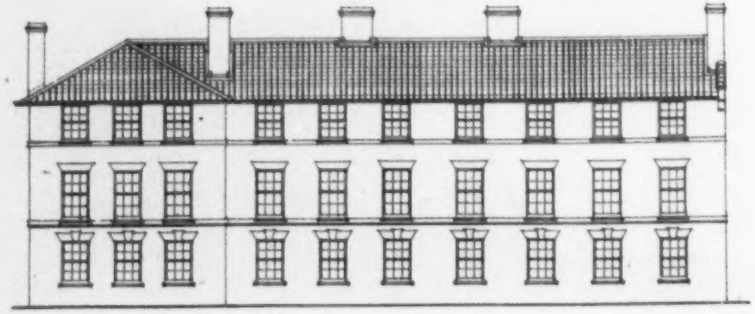
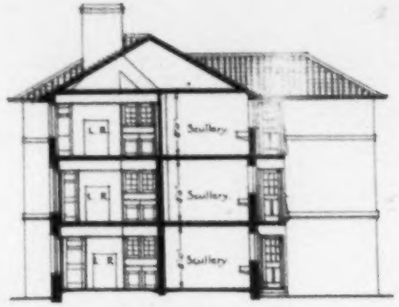
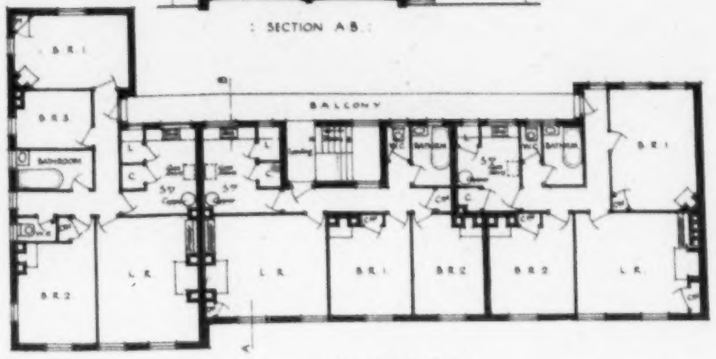


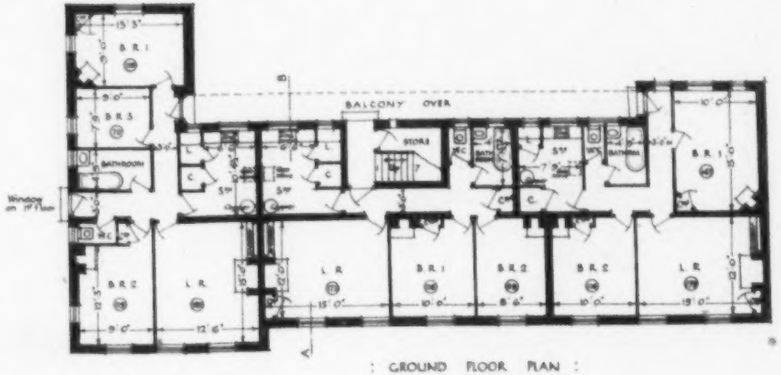
: FRONT ELEVATION :



: SECTION A.B. :



: 2ND FLOOR PLAN :



: GROUND FLOOR PLAN :
: 1ST FLOOR PLAN SIMILAR :

MR. ARCH. S. SOUTAR, LIC. R.I.B.A., ARCHITECT.

THE BUILDER, JANUARY 2, 1920.

BLUE BELL INN, INGLEBY CROSS, NORTHALLERTON. MR. WALTER H. BRIERLEY, F.S.A., ARCHITECT.

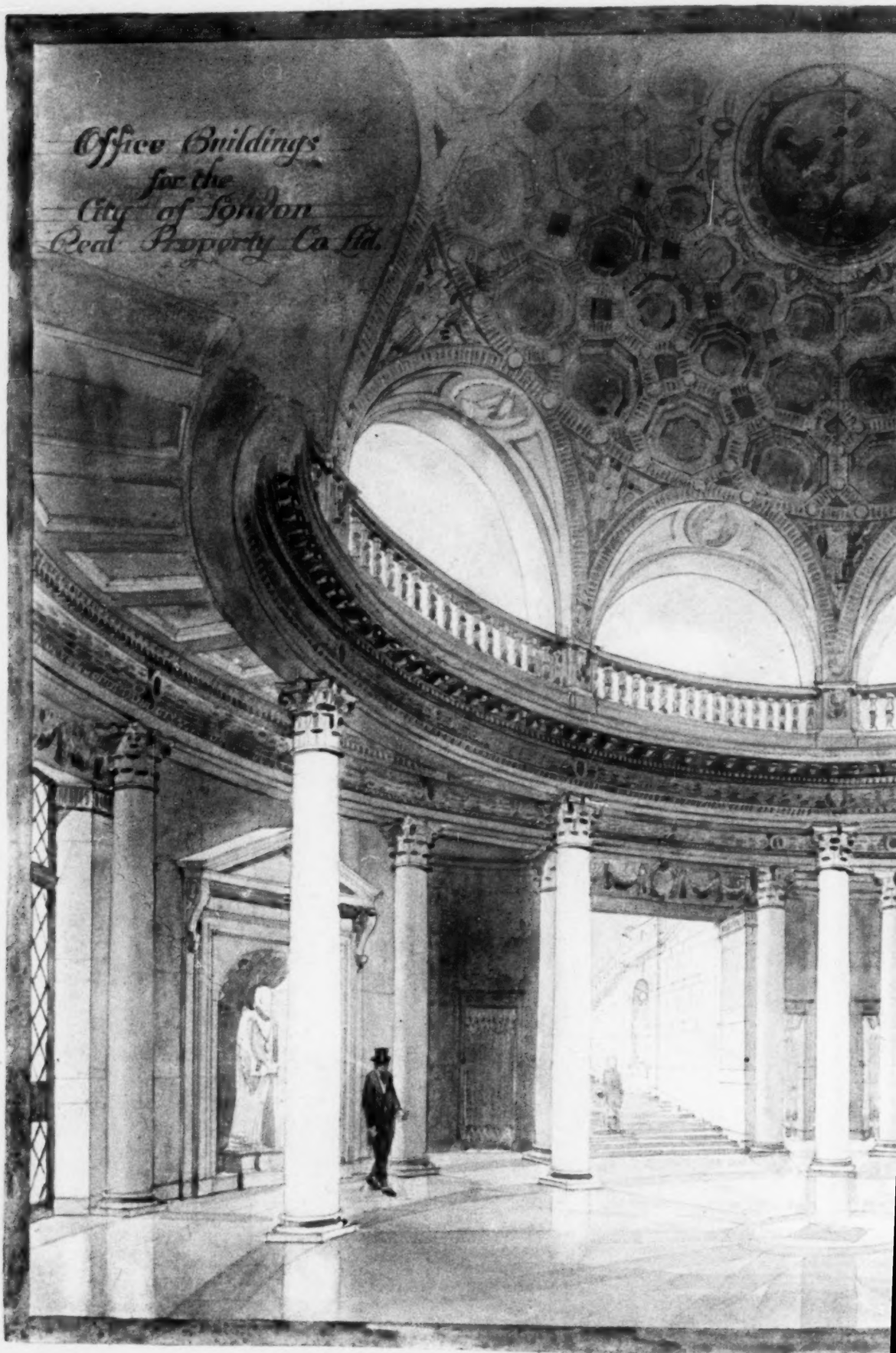
PHOTO: THOS. LEWIS, LTD.

SION HILL, THIRSK. COURTYARD AND ENTRANCE HALL.

MR. WALTER H. BRIERLEY, F.S.A., ARCHITECT.

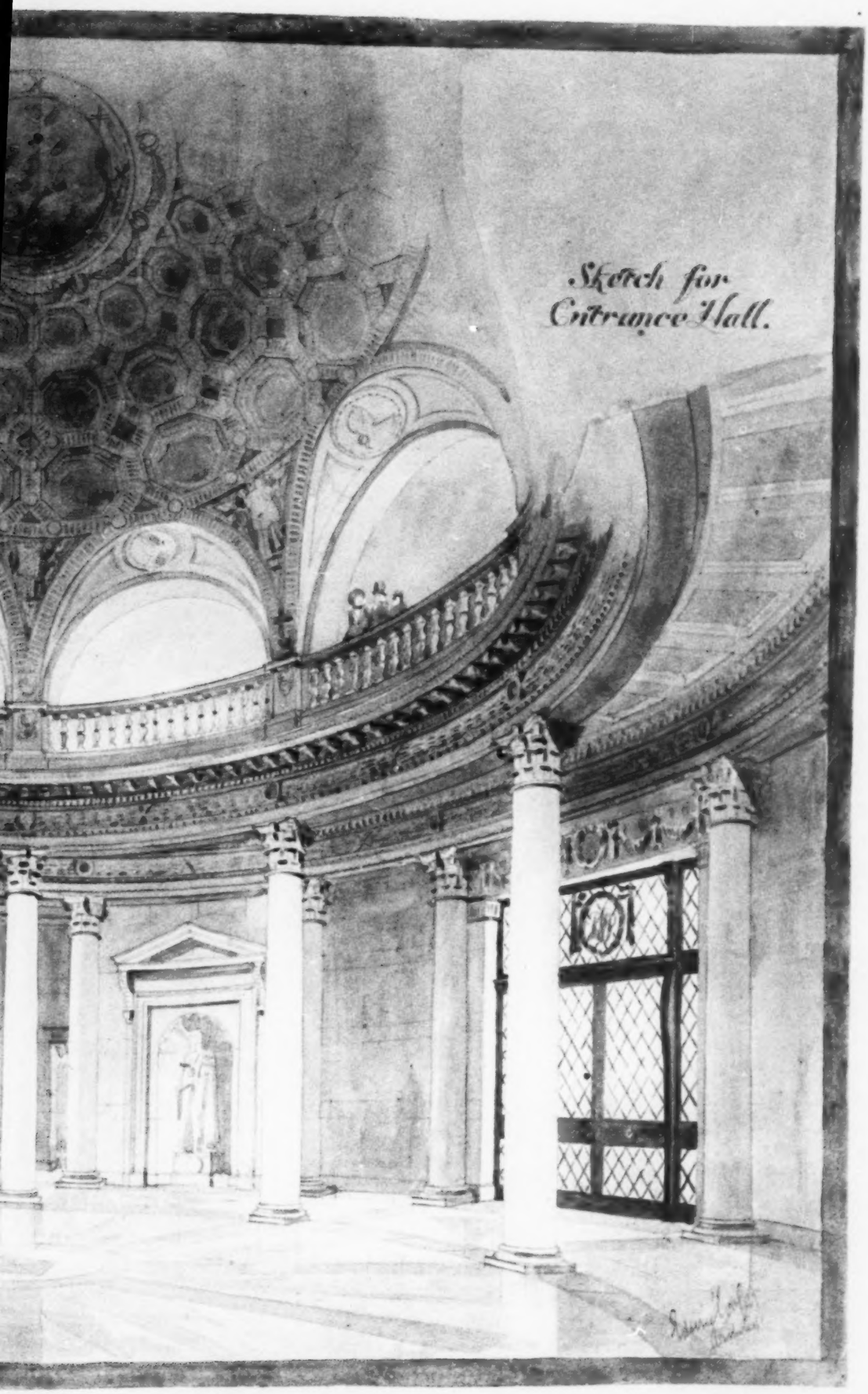
PHOTO: THOS. LEWIS, LTD.

VICTORY HOUSE, KINGSWAY. MESSRS. TREHEARNE & NORMAN, ARCHITECTS.



OFFICE BUILDINGS FOR THE CITY OF LONDON REAL PROPERT

MR. EDWIN COOPER, ARCH



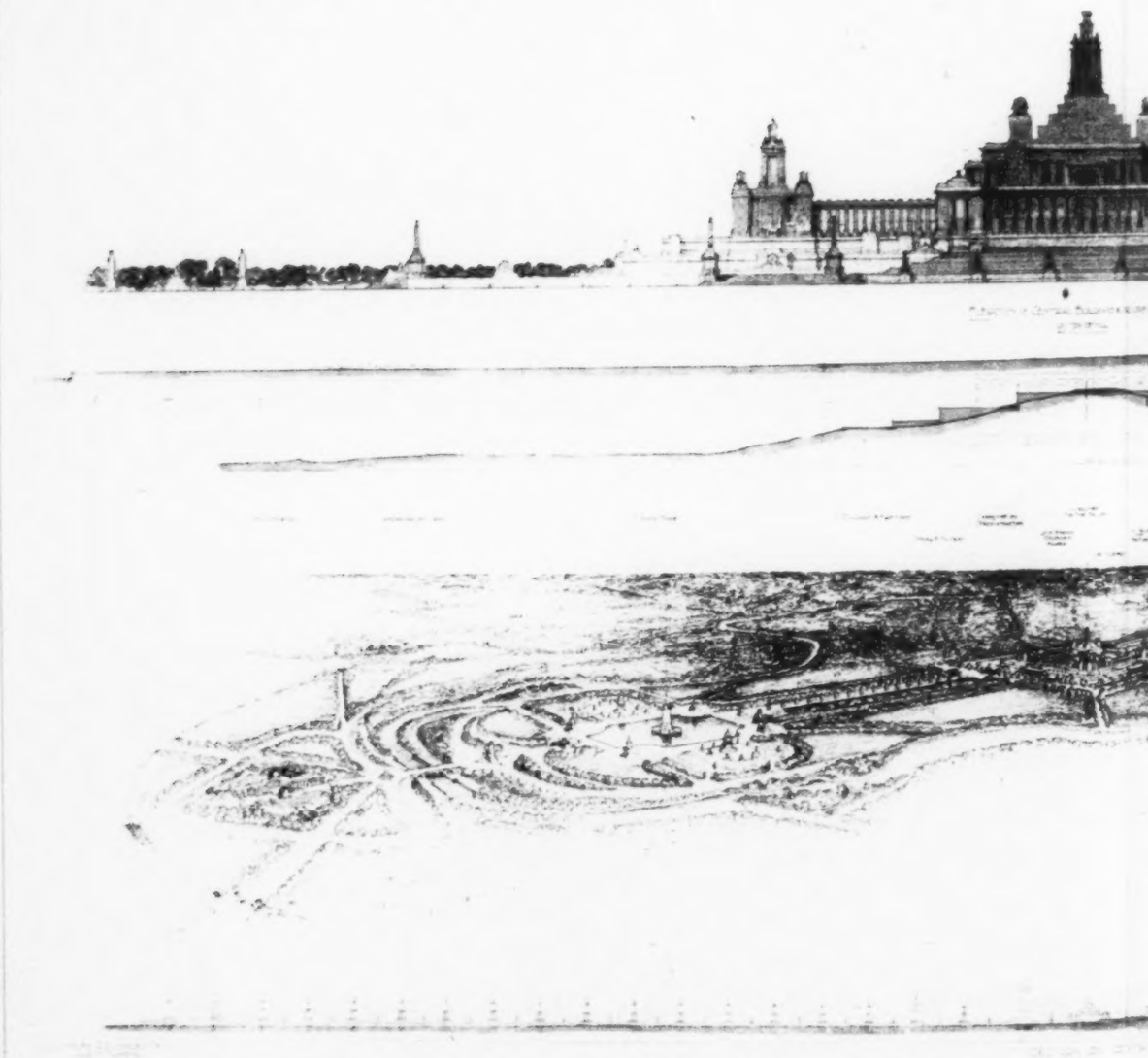
L PROPERTY CO., LTD.—SKETCH FOR ENTRANCE HALL.

OPER, ARCHITECT.

THE NEW WESTMINSTER HOSPITAL, CLAPHAM COMMON. MESSRS

MON. MESSRS. H. P. ADAMS AND C. HOLDEN, ARCHITECTS.

GENERAL VIEW OF NATIONAL MEMORIAL AND SECTIONS OF SIT
MEMORIAL TO THE DEAD · · · CONFERENCE HALL A



PROPOSED NATIONAL WAR MEMORIAL. MR. C.

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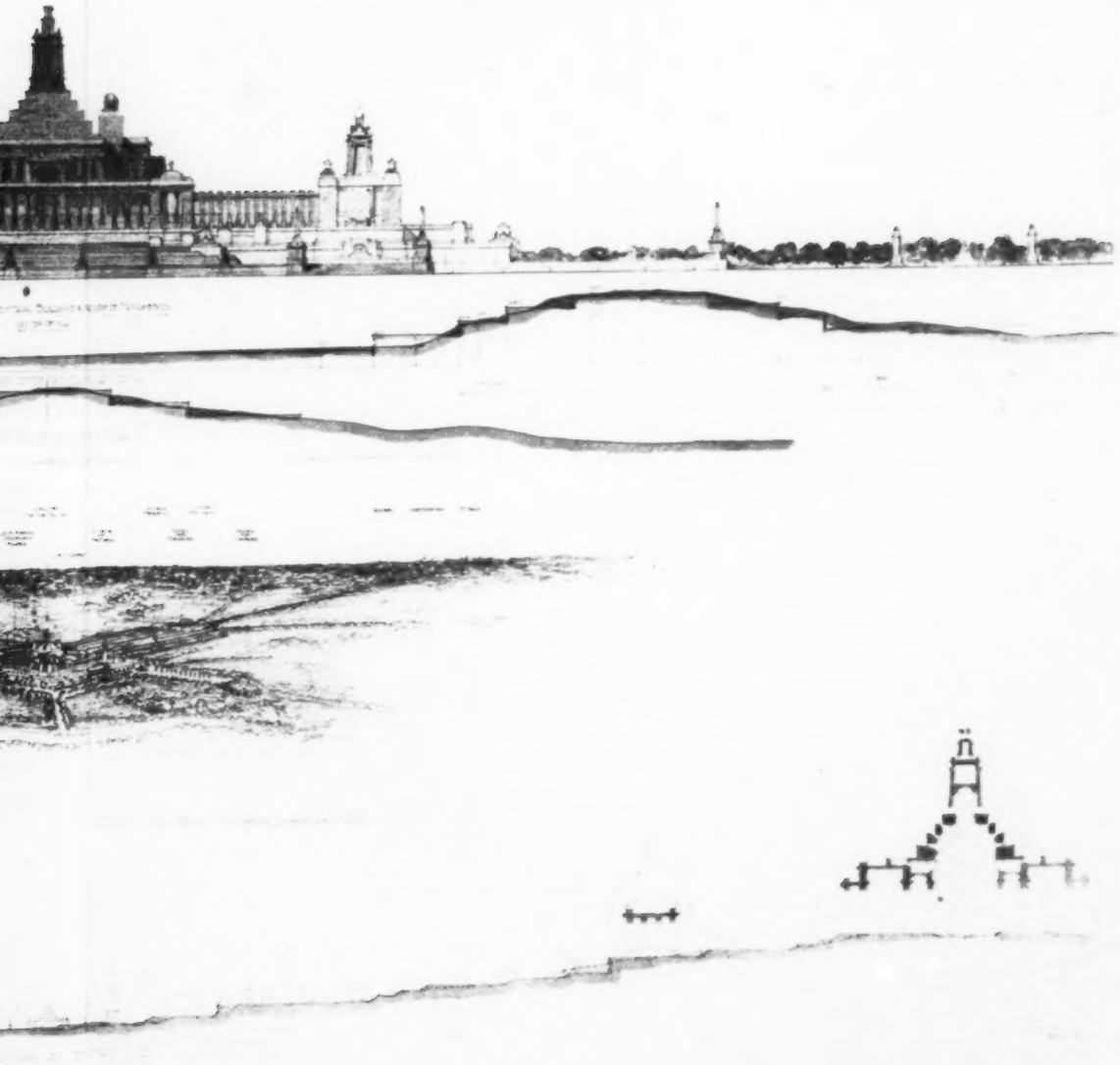

IAL. MR. C. STANLEY PEACH, F.R.I.B.A., ARCHITECT.

NATIONAL·MEMORIAL·TO·THOSE·WHO·BY·SACRIFICE·ACHIEVED·VICTORY

PLAN·SHOWING·AVENVES·OF·COMMEMORATIVE·TREES·LINKING·EXISTING·PARKS·&·COMMONS·
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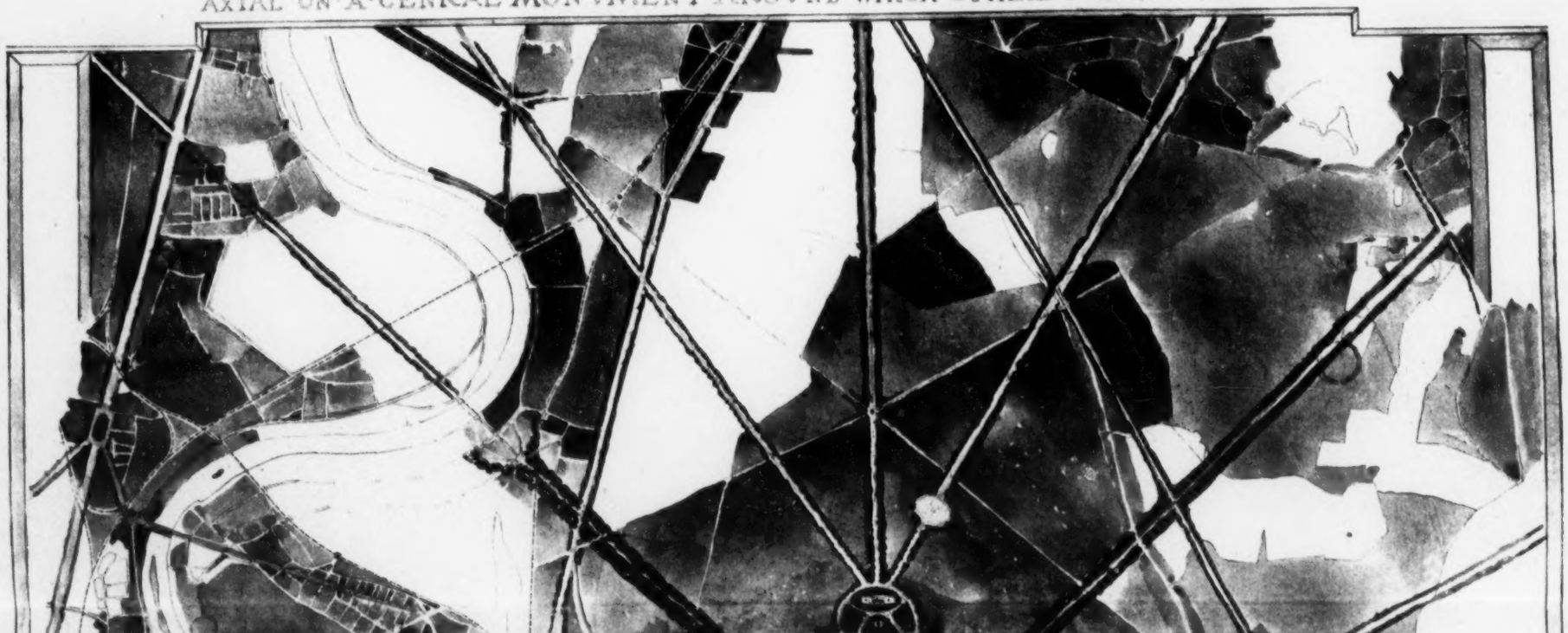
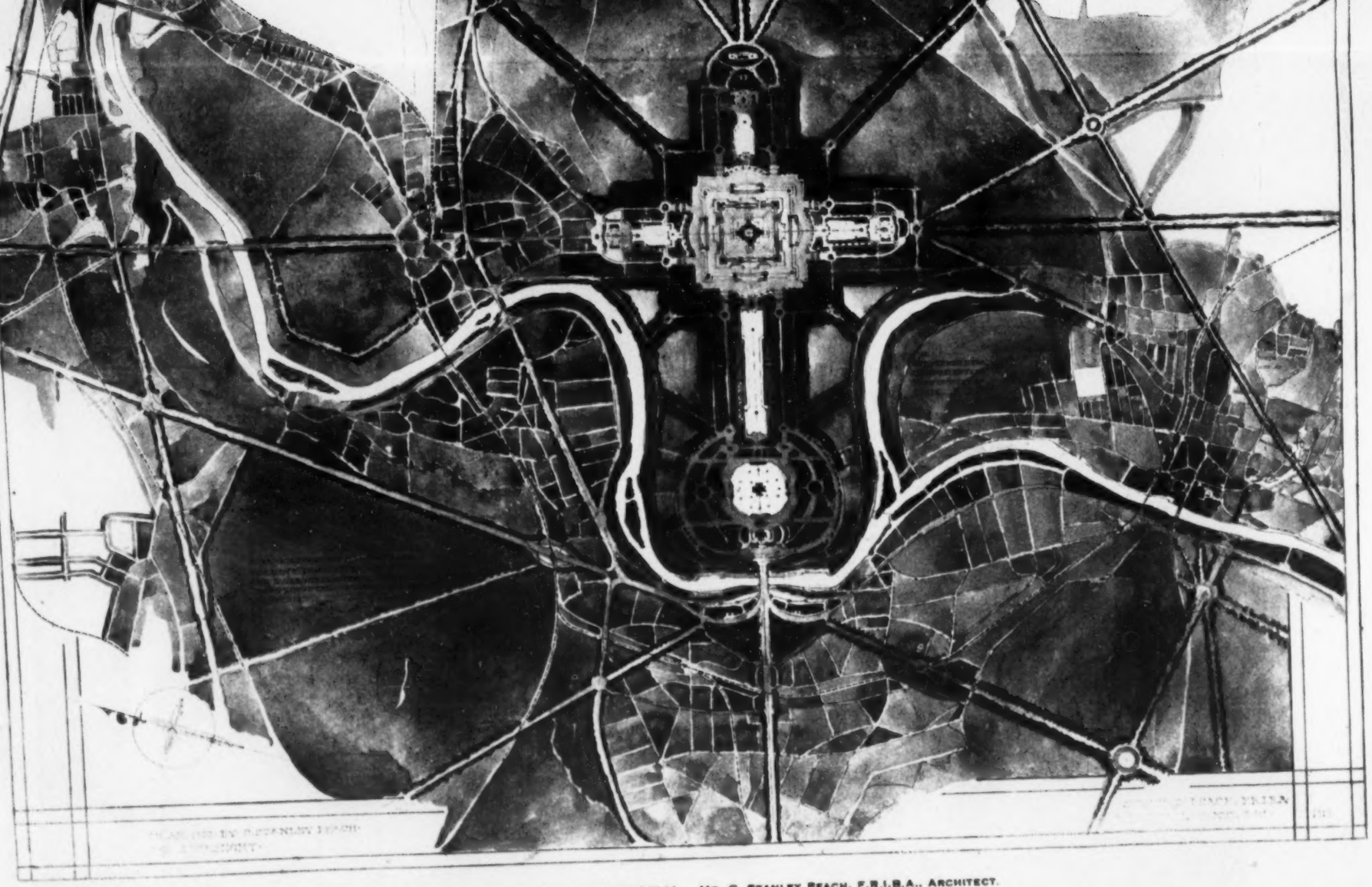
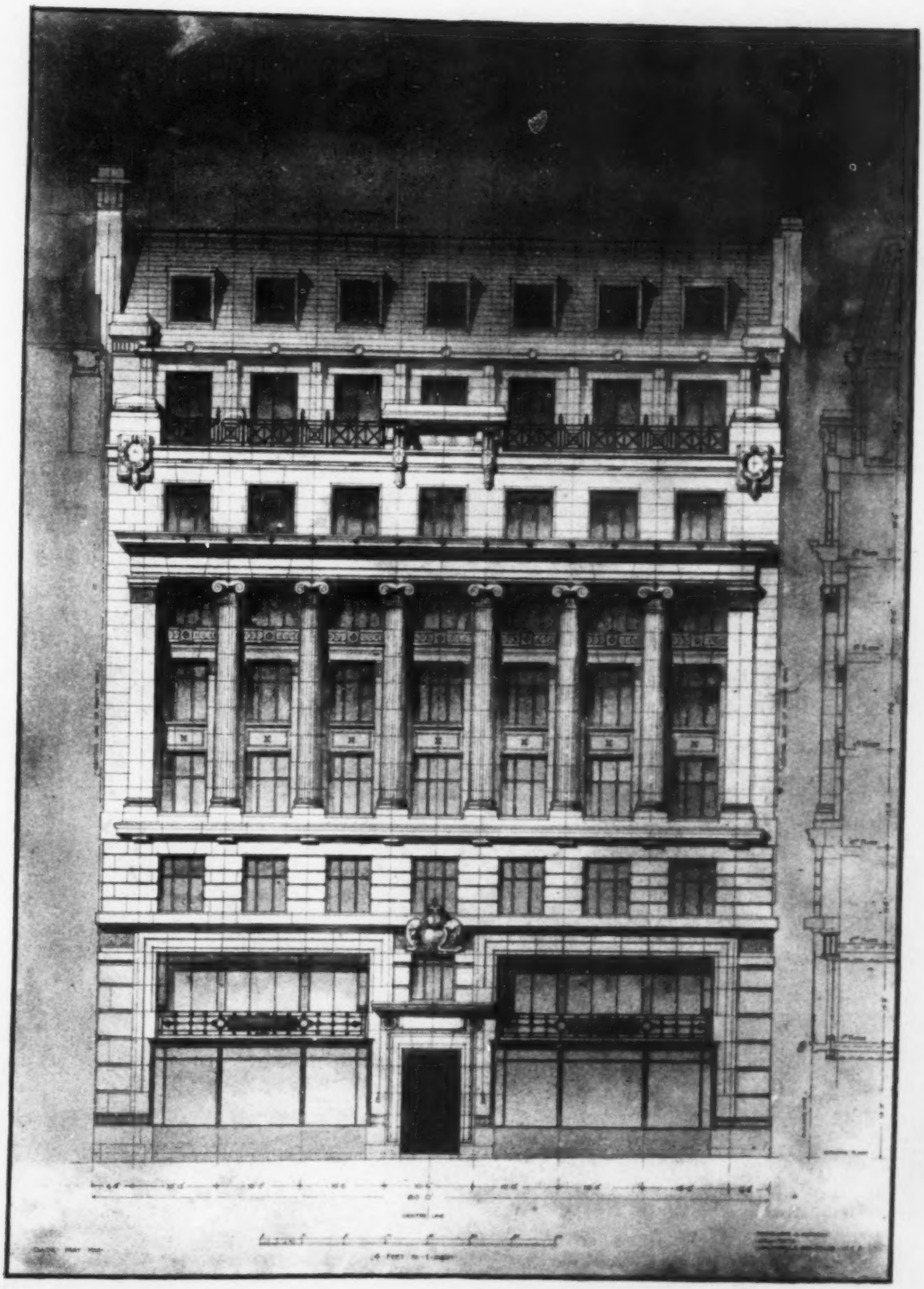




PROPOSED NATIONAL WAR MEMORIAL. MR. C. STANLEY PEACH, F.R.I.B.A., ARCHITECT.



PRINCES HOUSE, KINGSWAY. MESSRS. TREHEARNE & NORMAN, ARCHITECTS.

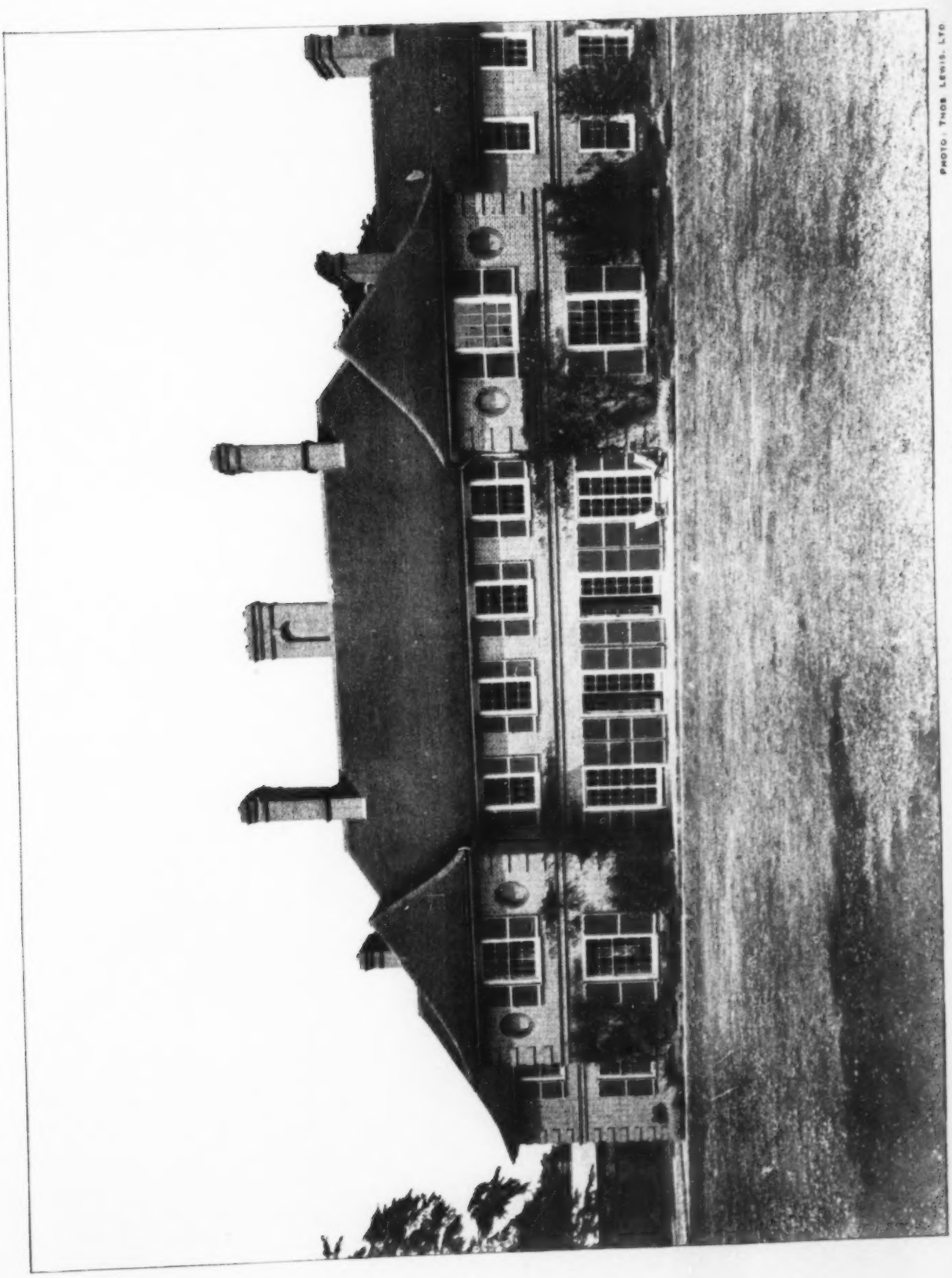


PHOTO: THOS. LEWIS, LTD.

SION HILL, THIRSK. SOUTH FRONT. MR. WALTER H. BRIERLEY, F.S.A., ARCHITECT

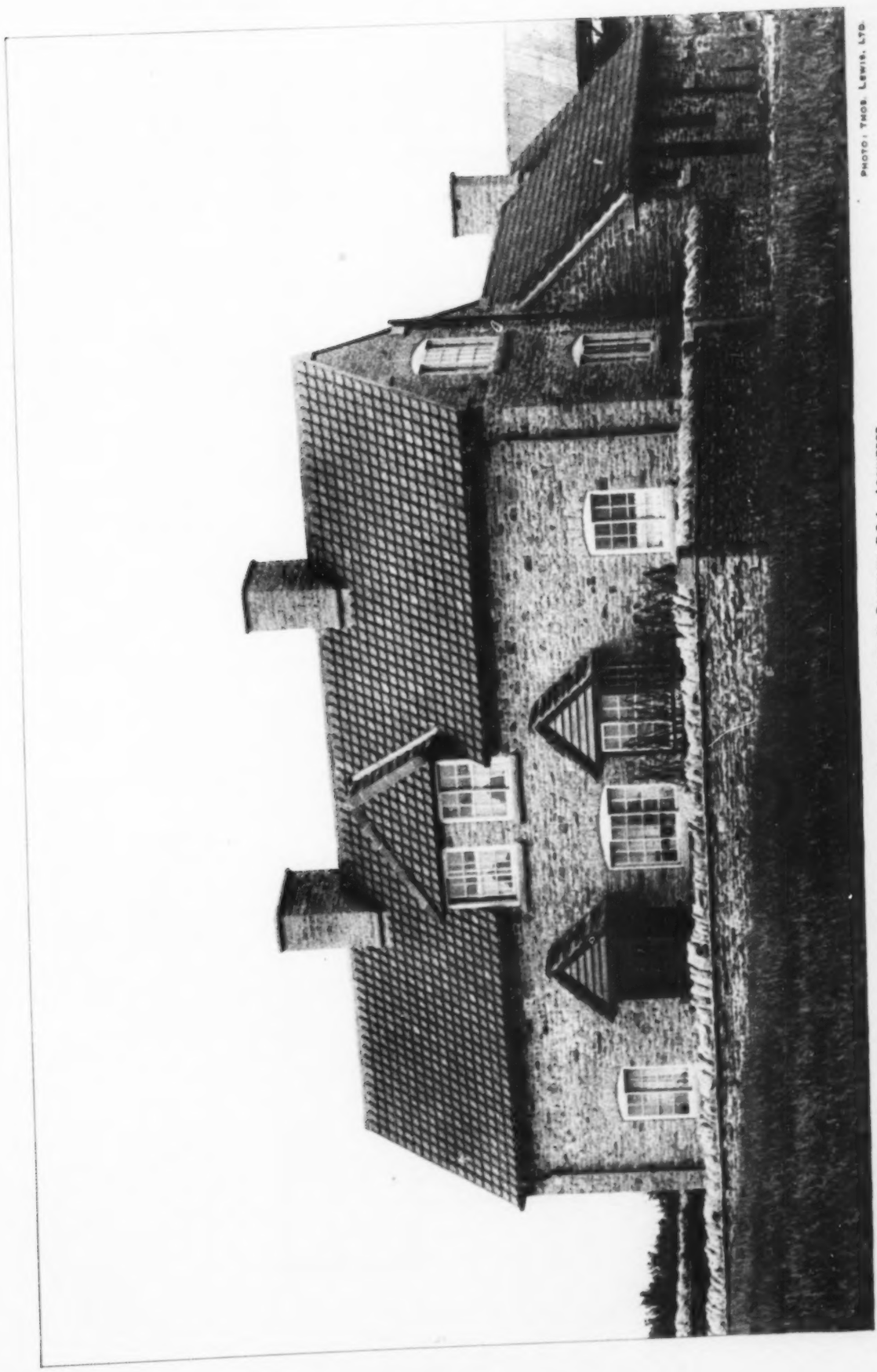
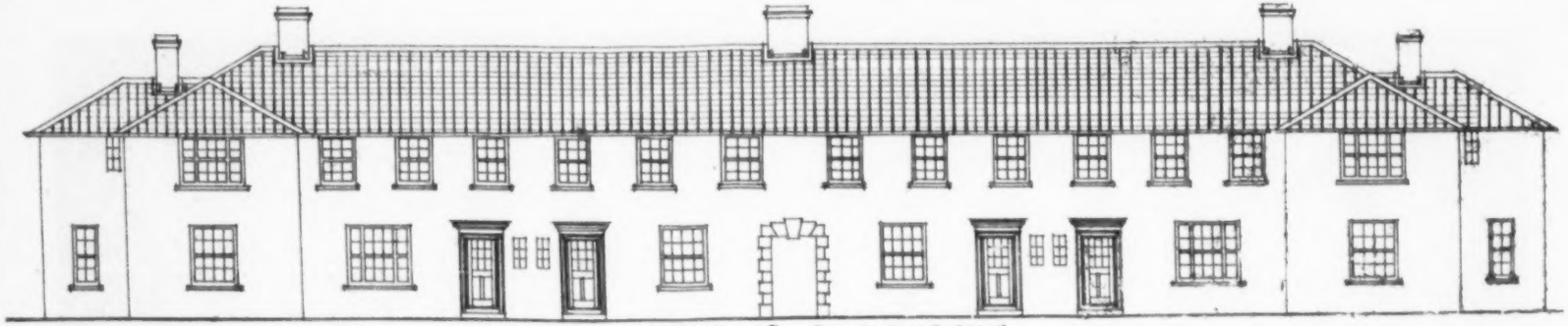
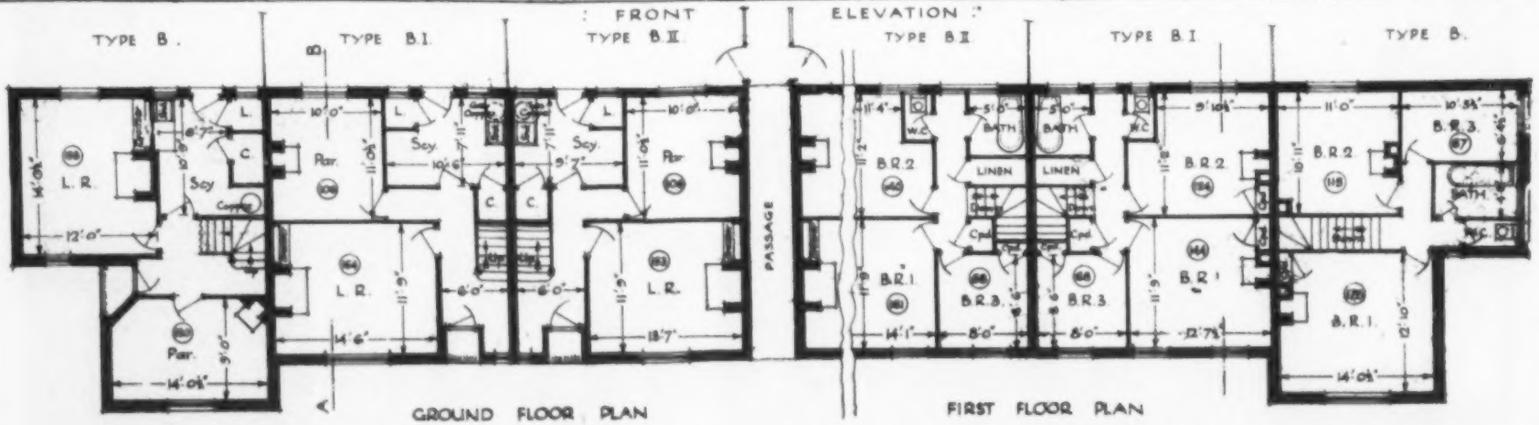


PHOTO: THOS. LEWIS, LTD.

FARMHOUSE, GILLING, YORKS. MR. WALTER H. BRIERLEY, F.S.A., ARCHITECT.





CUBINGS

TYPE B	14245 cu. ft. at 1/2 per cu ft.	£681	each
TYPE B.I.	11894 .	£604	.
TYPE B.II.	12696 .	£740	.

LIST OF ABBREVIATIONS:

L.R.	denotes	Living Room
Par.	.	Parlour.
Scy.	.	Scullery
B.R.	.	Bedroom
L.	.	Larder
C.	.	Coal Place.
Cpd.	.	Cupboard.
(88)	.	Area of Room

MATERIALS.

ROOFS. Bridgewater tiles.
WALLS. Stock brick fixings.
FLOORS. Timber joists & 1" floor boards.

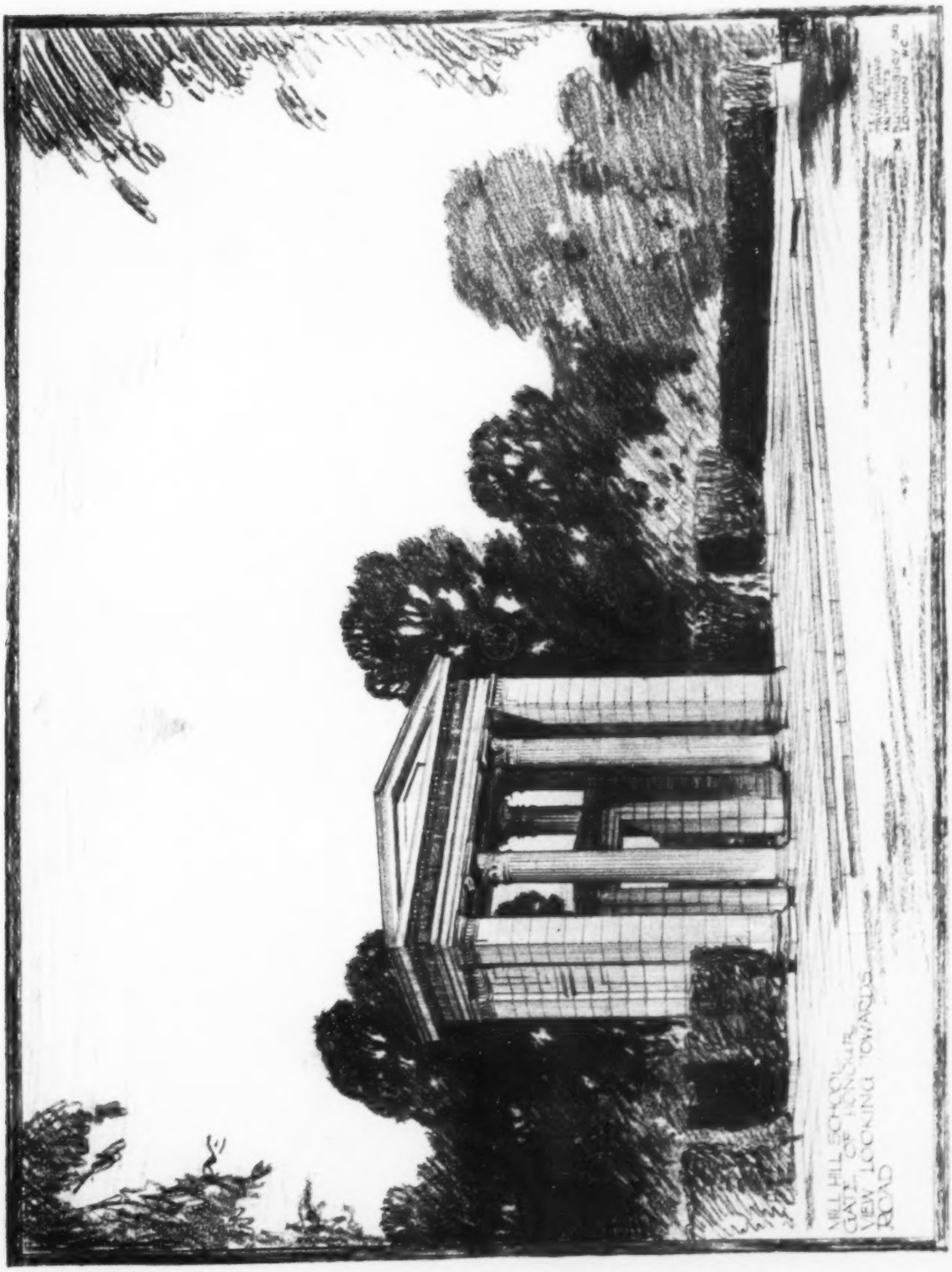
COST OF SCHEME

	£
FLATS - MARY PLACE	16,266
6 COTTAGES - TYPE B.	4,146
2 . . B.I.	1,388
14 . . B.I.	10,360
TOTAL COST £	32,160

SCALE OF FEET

ROYAL BOROUGH OF KENSINGTON, COTTAGES, MARY PLACE AREA.

MR. ARCH. S. SOUTAR, LIC. R.I.B.A., ARCHITECT.



MILL HILL SCHOOL WAR MEMORIAL.

MR. STANLEY HAMP, ARCHITECT.

THE TRANSPARENTE BEHIND THE HIGH ALTAR, TOLEDO CATHEDRAL.

GREEK AFTERNOONS AT THE BRITISH MUSEUM—I.

By W. R. LETHABY.

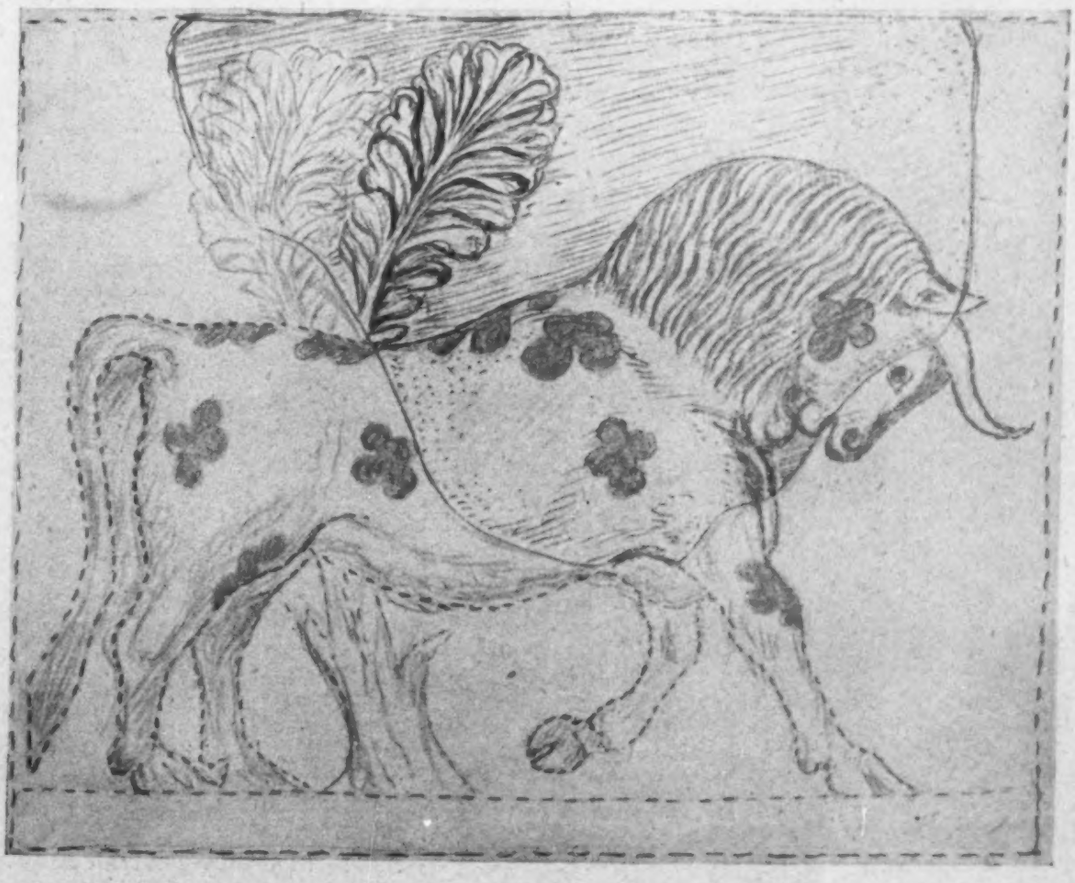
MYCENÆ, CRETE, TROY AND STONEHENGE.

THE Lion Gate and the doorway of the "Treasury of Atreus" at Mycenæ, have been in the books for a century, but the explorations of the last thirty years have given them a new and foundational importance for the history of art. They represent the first great European civilisation, which was part of a culture developed in the islands of the Ægean Sea and the lands surrounding it, with its centre at Crete and a strong outpost to the east at Troy. It is the culture to which the Homeric poems look back, and which underlies all Greek art. This Ægean art, moreover, was not barbaric; it was, of its kind, amazingly refined and accomplished. We have in the British Museum the most significant parts of the doorway of the "Treasury," and two fragments of important sculptured slabs, as well as many minor objects, ivories, vases, and gems, representing this school of art. There are also casts of the Lion Gate, and of fragments from Crete, Orchomenos and Cyprus. A study of these is at least a delightful architectural relaxation, and will teach the lesson that a living "architecture" is ever fresh and direct thought in building.

With the pillars and other fragments of the doorway of the "Treasury" is shown a restored drawing of the whole, as well as a printed description, both of which need revision. (1) The triangular relieving space above the lintel was not filled with a relief of lions, but by red marble slabs covered by bands of spiral decoration. Beyond the reasons which I gave a dozen years ago in a little study of the fragments, is the fact that the holes for metal fixings in the red slabs are for dowels and not for cramps; that is, these slabs were not fixed against wall, but as a screen. (2) In the printed account we are told of the great circular "Treasury": "This chamber is hollowed out of the earth in dome shape, and lined with regular concentric circles of squared masonry, narrowing gradually to the summit." This was impossible constructively, for, apart from other difficulties, the crown of the vault comes within a foot or two of the same hillside slope through which the entrance passage is driven, and against which the doorway was built. Clearly the whole circle for the chamber, as well as the straight passage, was excavated from above. As the courses of masonry were set in place, earth and rough stones were thrown in as a backing, rising with the work and gradually spreading over the "dome." This dome might doubtless be constructed without such backing, but comparison with other analogous structures, some of which are of square form, show that the counterweighting of the outside was in view: it was essentially "oversailing construction." (3) On the same printed account the monument is dated about 1000 B.C., whereas 1500 is a better date. May I say here, with all reverence, that the British Museum does not revise its information frequently enough? Every trivial suggestion that is made cannot be followed, but what is proved should be accepted without delay, and even the best hypothesis up to date should be recorded.

It has hardly been brought out in any descriptions that this great doorway was designed and constructed as *polished marble work*, in which variety of colour was of the essence of the intention. The relieving triangle was filled with highly polished slabs of strong red (*rosso antico*, not porphyry as Perrot says); the pillars and lintel were of a quiet grey-green; and the bases were of strongly marked *breccia*. The eyes of the spiral decorations in the tympanum seem to have been filled with coloured paste or glass, and on the lintel were bronze attachments, doubtless gilt. The polishing of marble was so general in Ægean architecture that imitation marbling is found in painted decorations.

The methods of workmanship were as remarkable as the design and the large scale of the work. The ordinary masonry of the façade was dressed down after fixing; at least the fascias around the door opening were sunk after the blocks were in place, as is shown by the fact that the upright joints do not coincide with the edges and the sinkings. The marble work was fixed with metal cramps and pins, and the cavities for these were sunk by tubular drills. Two holes being made side by side, the material between was then cut away. A still more remarkable fact is brought out by an examination of the *rosso* slabs. These were cut to size by sawing. The waving surface left by the saw at the back is very similar to what appeared on the backs of the Parthenon slabs when they were recently taken down. These had been cut thinner by Turks or Greeks employed by Lord Elgin to lighten them, and I am told it was done



with twisted wire. On the edges of the Mycenæ slabs the striated markings of the saw are plainly visible. Another point is that these edges are polished for about two inches from the face, a method followed in later Greek masonry.

It may be observed that, except with stones that split up easily, like slate, slab construction is likely to imply sawing, and slab construction was very general in Ægean building; from it arose metopes and triglyphs. The bronze decorations, once studded over the dome within, are usually spoken of as rosettes; they were doubtless stars, as in Egyptian tombs.

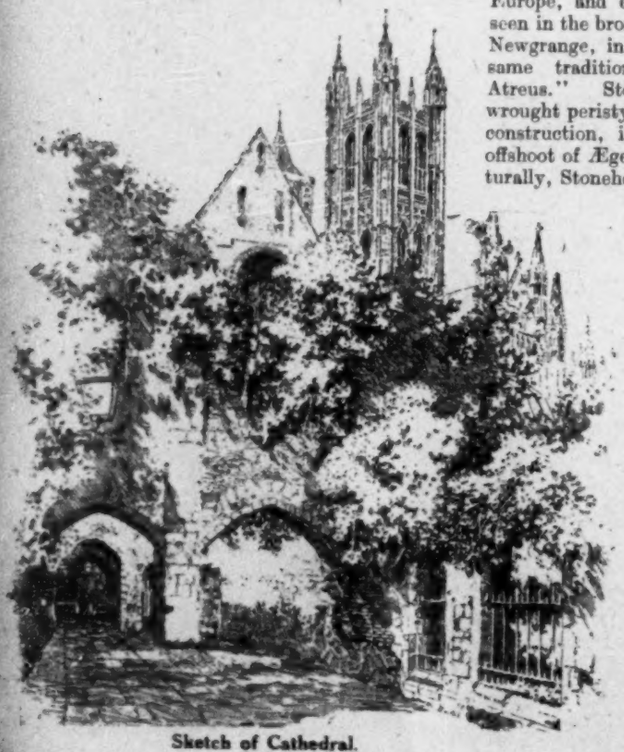
Close to the great doorway in the Museum are two fragments of slabs, which were sculptured with reliefs of beasts, one of which was for long taken to be a lion. This slab is broken in such a way as to suggest that it might have been part of a filling to a triangular relieving space above a doorway. It will be well to put it on record that certain sinkings for metal cramps on the edges of the slab were made when it was formerly fixed to the wall of the Museum; they should now be filled up, as being misleading. The other fragment is part of an ox, and about twenty years agone a German scholar showed that both formed part of one sculptured band, which he called "the Oxen frieze." Some years since I noticed a point which proves that it was rather a dado, and this is, archæologically, of some importance, having regard to sculptured dadoes generally. On the top edge of the second piece is a dovetail sinking, which is explained by other dado linings found in Crete by Sir Arthur Evans; these had been linked through the thickness of the wall by wooden ties. The method arose by lining the bottom of crude brick walls. The edge of this slab is also rebated, so that the slabs either overlapped at the vertical joints, or there was a thicker triglyph-like block between each pair. This latter was, I think, the more probable in this case, as this slab or panel was divided horizontally through the relief, and, moreover, the character of the notch suggests that it was covered by a thicker piece. The beasts stand in opposite directions, and this may mean that they were on different sides of the porch in which they would have been placed. We thus recover an important sculptured dado, similar to the well-known Assyrian reliefs, which, I believe, followed the tradition of the Ægean slabs. Our slabs were painted, as is shown by the outlines of spots similar to those found on Egyptian paintings of cows. Perrot also thought that there was a trace of colour in the sinkings of the carving. I give a restoration of the relief, which was formerly thought to have been a lion. The vegetation at the back represents lilies. The details which exist should be compared with the oxen of the marvellous gold cups of Vaphio. They are so similar that both works must be nearly of one time, about the XVIth century, B.C. It is rather taken for granted that these fragments were obtained at Mycenæ, but it is possible they were found at Tiryns, or even Athens. The material would be some clue; a chip of it might be sent to Athens for information on this point. The slabs imply the existence of an important palace.

Again I would lay stress on the competence and civilised nature of all the work; the capitals of the pillars have an elegant profile, and their decoration is exquisite, the idea of a flower on its stem was present to the mind of the designer, and the zigzags of the shaft suggest leafage. For the rest the banded decoration of alternate mouldings and spirals, and also the rosettes, are taken over from pottery painting. The special love for rosettes in this art seems to have come from the ends of wooden ties embedded in ordinary masonry and spotting the surface all over.

The influence of this great art epoch was in some degree spread over the whole of Europe, and even to Britain, as may be seen in the bronze-age weapons and pottery. Newgrange, in Ireland, is a tomb in the same tradition as the "Treasury of Atreus." Stonehenge, with its rough wrought peristyle,* and tenoned and joggled construction, is, I am confident, also an offshoot of Ægean art. Looked at architecturally, Stonehenge should rather be dated

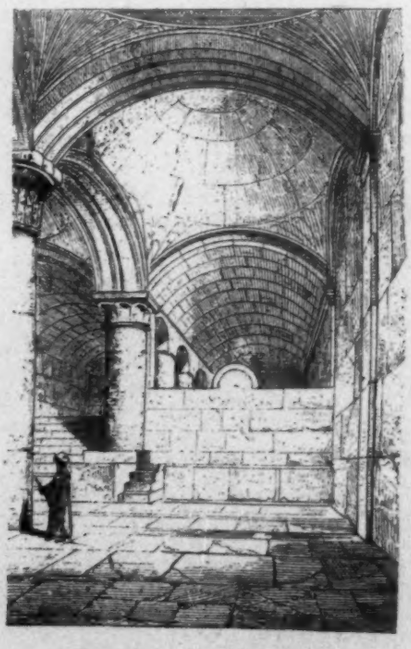
Sketch by Railton from "Westminster Abbey."
By W. J. LOFTIE (Seeley & Co.)

c. 750 than a thousand years earlier, as is now the fashion. It is not a "rude stone monument," but a work of architecture. If we think of it built, as it must have been when first finished, fair and shining, we shall appreciate the fact that it was a work of precision, accurately set out and "scientifically" constructed. Notice the tenons of the uprights which fitted into the stones of the "entablature"; such tenons are characteristic of Mycenæan construction. I have little doubt that the great jamb stones of the Lion Gate, as they are not upright but inclined, must have similar tenons. What appears in Stonehenge of refinement was present in the thoughts and life of the people who made it. It can hardly be that the earliest known work of wrought masonry in Europe should stand unrelated on a remote island in the Western Sea. We have strangely neglected the story of our own antiquities, and swept them aside as savage. They represent the outer fringe of European culture—Mycenæan, Greek, Roman and Christian.



Sketch of Cathedral.
By JOSEPH PENNELL; from Van Rensslaer's "English Cathedrals."

* To avoid recognising that this is really a colonade and entablature, it is even usual to speak of it as "a series of triliths."



Drawing from "Histoire de L'Art dans L'Antiquité."
By PERROT & CHIPIEZ. (Hachette & Co.)

SOME THOUGHTS ON DRAWING.

By T. RAFFLES DAVISON.

To achieve a real measure of success in anything, it is necessary to have some bravery of soul, some solid ground of confidence and self-determination, for whoever is daunted at every turn by fear and mistrust is lacking the sheet-anchor of existence. If this is a true point of view with regard to the affairs of life generally, how especially does it apply to the pursuit of the art of drawing? One has only to think over what one knows of the history of art, and to note the floods of advice and direction so freely offered to the student, to realise that in the very abundance of counsel and example the student is apt to lose sight of himself and his own possibilities. The head and front of all sound advice is contained in the Shakespearean sentence: "To thine own self be true." If it happens that we have no particular self, it cannot be helped: but it is before all things advisable to find out as soon as possible if we have any especial and individual self. Whether written words are of any value to us must depend partly on our receptivity and power of absorption; therefore, the notes here set down (which have not been given unsought) may not owe their ineffectiveness entirely to the failure of the writer! At least they are offered as the impressions gathered from a long experience and a firm belief that without truth as a pole-star we can never see the world or our art aright. They are addressed to students from a student who knows that the young (whether in years or spirit) take well-meant advice in a generous spirit.

Where to begin a polished essay on drawing might be doubtful, but we may well leave the subtleties of the subject to the essayist and try to put down something which may help to define our aims, and, above all, to help and sustain our courage—for do we not all need good store of courage? Is there any artist, whatever his gifts may be, who does not need all his courage if he is to give any special message of beauty or distinction in face of all the wealth of art which the world has already produced? Besides which he has to face the endless array of critics, and the often discouraging opinions of the world in general.

Though none of us can afford to ignore the opinions of our fellows, and would, indeed, be foolish to do so, I think that the opinions of those about us, expressed or implied, may be harmful unless our aims are clear and our purpose set. It does not matter what we are trying to do, we are sure to meet much to oppose and discourage, whether we are painters, parsons, politicians or profiteers! But, having settled what we want to do, it is good—it is a vital thing—to have a big store of the pertinacity which is supposed to be a special quality of the British race. This seems to me of great importance, because it means so much in the development of individuality and character, which to the artist is all-in-all. But with a good store of courage, with a genuine love of art *for its own sake*, and a thorough determination to be honest with ourselves, we can face all the wonderful records of the past and our present-day critics with some degree of confidence, and even do our best to profit by them. I always remember being advised to go and sketch some certain subjects, and, having objected that they had been done so finely by certain artists, being told that such an objection mattered nothing, and that it was the artist's own individual expression of anything that alone counted (this was many years ago, and it has often heartened me in my efforts).

During the last forty years we have seen a wonderful output of beautiful drawing, and some of it is not the less beautiful in that its remarkable quality has appealed to a limited number. The dainty and piquante charm of Pennell's series of cathedral drawings seems to have touched the sympathies of a very wide public, and on a lower plane the sparkle and dash of Railton's drawings also reached a, perhaps, even larger public; but the exquisite drawings which have been sent in for the Pugin studentship have naturally given to the architect a deeper and more abiding pleasure than these more popular drawings. But in all these we must recognise that the artists gave free play to their own individuality, and that this was the essential element in their success.

We must not, of course, forget that in a boastful and advertising age we are liable to mistake the determination for self-advertisement at all costs for a proper cultivation of individual gifts, as that might only be carrying us further from the truth, which is, indeed, clearly seen in much modern work. Neither artists nor musicians are wanted by the public unless they can add to the world's enjoyment. They may do this, of course, without laying claim to any originality, but it needs some fresh touch behind the work to rouse enthusiastic public regard. But why should anyone deny himself his own first pleasure in his art? If he does not find pleasure in it himself, who else is likely to do so?

It might seem to some of those who take the trouble to read these notes that this matter of courage is somewhat laboured, but my own experience tells me that you cannot over-emphasise its importance. The great obstacles to success are hesitancy and fear—hesitancy to put our powers to the test, fear as to what others may say. This is a thraldom which we must clear right away, as we can make no real progress without freedom and courage. It is a useful study to work in the styles of others whose work is characteristic and good, for this may lead to the discovery of our best form of expression, but it is for each one to find that out as best he can. Deliberately copying the work of others may be very educative, but there are dangers in it which may equal the benefits. It will surely be a test of a draughtsman's powers to imitate the patient, clear, refined and truthful draughtsmanship of French artists, such as we may find in Perrot and Chipiez's books, and then have a try at the dot and dash methods brought to such telling results by Railton and others. But I defy you, if you have a strong sense of truth, dignity, reserve and balance, ever to become enamoured of the latter or achieve any great success in such ways. If you are true to yourself, your character must show in your drawing: to pretend that character or moralities have nothing to do with art would be to deny any understanding of the difference between the clean, jovial freshness of Randolph Caldicott's figures, and the sickly morbidity of those by Aubrey Beardsley. The latter are, of course, beyond all comparison finer art—in fact, you can hardly compare them—but some of us would, in such cases, have little hesitation in making our choice of methods.

No one could make a hurricane sketch like that by Rickards here given, of monumental design, who had not a keen sense of architectural values with the power to express them in a most convincing way. No architect can look at this whirlwind sketch without realising how vividly it conveys the character which the author has shown in all his finished work, even almost to the contours of the mouldings which are not drawn at all! Courage may be closely allied to imbecility, we may clearly see, for that is what such a scribble would be except from the hand of an accomplished architect. Such a sketch is, I think, an example of undiluted courage.

Who can say how a student with generous instincts shall make a choice between one kind of drawing and another? Yet, if he finally settles down to a character and style of his own, he must surely do it. You cannot draw drapery with the meticulous care of a Leighton, and yet hold a determination for freedom and breadth which would never allow you to give so high regard to detail. You will never reach a fine result in pure line drawing and flat decoration if your thoughts all run on plane values, on tones and modellings. You cannot be the lover of intimate, beautifully-dainty detail, and yet draw stuff in big, bold ways like a Michael Angelo; but you can, at least, be yourself, built up into a character which betrays your real sympathies. If you have no beliefs and no sympathies, you will never get anyone to believe in you or care much for what you do. Even in drawing you can raise or lower the standard of what you represent. A beautiful grey monochrome with clean lines of detail may suggest a building of greater refinement and possibilities than the working drawings suggest—whilst a fussy, coarse drawing will belittle the most beautiful design.

So, what you think of a building or a landscape must appear in your drawing and add to your subject a reflection of yourself. We are all out for true enjoyment of life, and the wider our sympathies the more likely we are to get it, so it is unwise to affect a superiority to anything which conveys some message of beauty and truth. We begin life with enthusiasm and generosity—happy are we if we can end it in the same way!

Sketch of Monumental Design by Mr. A. E. Rickards.

RECORDS OF ROMAN LONDON.

DURING its long existence, the *Builder* has recorded discoveries which from time to time have been made of Roman remains in London, and it has been thought that it would be helpful and facilitate reference to print a summary of these. It will be noticed that the items are arranged according to date, inversely from 1915 to 1847.

One of the reasons for preparing this synopsis is to suggest that, as many small discoveries and observations must be made by those who are engaged in building in London, it is most desirable that these should at once be recorded. The least fulcrum of evidence may be sufficient to upset a vast mass of ill-founded theory. The underground story of London was long neglected, and we cannot afford to let slip one link of evidence. Thus, in the erection of the new hotel by Piccadilly dip it was found that the site is over the course of the old stream that ran into the Thames at Westminster. Again, the large works that were recently executed in front of Buckingham Palace must have been near this same stream, and also near the course of the presumed ancient road between Tyburn and Westminster. Near by, moreover, was an important old centre called Rosamund's Ville, the name of which long survived in Rosamund's Pond. Licence to crenellate a mansion here was granted c. 1300. Even if no remains of handiwork were discovered on this wide site, valuable observations must have been made of the character of the ground. We would invite anyone who has special knowledge of finds made in London, however unimportant they may seem, to put them on record. The L.C.C. now pays some most praiseworthy attention to the antiquities of London, but the results they obtain are not sufficiently made known, and the same is true of the acquisitions in the London museums. We need a Year Book, or at least an annual Tract or Report on Old London.

W. R. L.

ST. MARTIN'S-LE-GRAND AND LEADENHALL MARKET.—In clearing the site for the old G.P.O. (Smirke's) building (1825–9), a large number of Roman relics were found. As the result of renewed excavation there in the winter of 1913–14, described by Mr. F. Lambert, of the Guildhall Library, to the Society of Antiquaries, there were found Roman rubbish pits beneath a concrete raft; relics, mostly of first and second centuries; head of a statue of Venus; intaglio seal of eagle and hare; Jewish coin struck in Palestine in the interval 132–5; gold ring with initial letters Q.D.D.; and the front of a mould for making medallions for pottery. Mr. Lambert's report related also to discoveries made in 1880–1, when the site of Leadenhall Market was quite uncovered, and to the remains of a Roman house; of walls, 6 ft., 7 ft., and 11 ft. thick, near Halfmoon-passage (now occupied by the market avenue to Gracechurch-street); a wall 12 ft. 7 in. thick, lying for 150 ft. almost due east and west, and a solid brick pier of Roman construction, 10 ft. by 6 ft., and 3 ft. 4 in. high. In Gracechurch-street, in 1912, Roman foundations were discovered on the site of the Mercantile Bank of India, 30 ft. below ground, at the street's north end, vestiges indicative of a large public building; and beneath the site of Nos. 37–41, a Roman well about 20 ft. deep and 3 ft. 6 in. diameter, at a depth of 27 ft., was unearthed. (February 26 and March 12, 1915.)

LOWER THAMES STREET.—Bunning, the architect (1848–9), induced the Building Committee of the Coal Exchange to preserve and render accessible the hypocaust and thermal chamber below the foundations of the building. (February 19, 1915.)

In digging for a foundation at No. 125, between Fish-street-hill and Pudding-lane, there were found the base of the Roman Wall, resting upon long and thick timber-baulks laid crosswise, with pointed piles spaced beneath them, the masonry being of three courses of rough rag and sandstone capped with two courses of yellow bonding-tiles, all encased in reddish mortar, 3 ft. high, 10 ft. wide, and at a depth of 24 ft. below the surface of the existing pavement. (January 19, 1912.)

BEVIS MARKS.—Roman pottery and urns were discovered 25 ft. below the roadway. (September 19, 1908.)

AMERICA SQUARE, MINORIES.—In sinking foundations for offices on the sites of Nos. 15 and 16, a piece of the Wall was discovered in an excellent state of preservation, about 40 ft. long, 8 ft. 6 in. wide; a portion was to have been preserved. (September 5, 1908.)

Dr. Philip Norman's lecture on the situation and extent, 332 acres, of Roman London; convergence of the Roman roads to London; the West, latterly New, Gate proved to be Roman when the prison was pulled down, 1903-4. (Feb. 22, 1908.)

CHRIST'S HOSPITAL SITE AND KING EDWARD STREET.—In clearing the ground for the new G.P.O., "King Edward VII Building," there were discovered about 400 ft. of the substructure of the Wall, with two rounded bastions (one being at the angle of the return southwards to New Gate) and lying along the axis of the school dinner-hall (by John Shaw, 1825–9), 7 ft. wide at 2 ft. below ground, and going to a depth of 16 ft.; at the Ditch (the boys' northern playground), 75 ft. wide at surface, 35 ft. at bottom; coins, bone skates, pottery, cinerary urns, &c., were also found; much of the Wall was destroyed by the workmen. (February 1 and 29, 1908.)

NEW GATE.—Dr. Philip Norman's lecture on "Roman London," and substructure of the Roman Gate, unearthed 18 in. below the pavement in 1903–4, for the new Sessions House. (February 22, 1908.)

CANNON STREET.—A report was made to L.C.C. meeting of the discovery, on the site of the new fire station, of a Roman bath; weight about 7 tons; inside dimensions, 5 ft. 3 ins. by 10 ft. 6 in. (Dec. 9, 1905.)

JEWRY STREET.—A fragment, 12 ft. high, about 20 ft. long and 9 ft. thick, was found, one half of its height being beneath the soil. The Wall here formed the boundary on the east side, in part, of the street, and the owner expressed his intention to preserve it. (Nov. 18, 1905, and Dec. 9, 1905.)

GEORGE STREET, CRUTCHED FRIARS.—Discovery of a length of the Wall of which some 50 ft. was through necessity destroyed. (May 20, 1905.)

THE TOWER OF LONDON.—In laying foundations of the new guard-house, on the site of the old "Stone Kitchen," between Coldharbour Tower (site) in the Inner Ward and Wakefield Tower, about 18 ft. from the S.W. angle of White Tower, there were discovered Roman masonry, with section of squared hot-air flue-pipes in one fragment; the bonding-tiles were remarkable as showing a section of three layers, namely—an inner dark blue streak between two red streaks. There was also exposed to view a curtain-wall, mostly of rag, chalk, and rubble, extending northwards from Wakefield Tower. (June 10, 1899.)

(Discoveries in the Tower in the past 20 years refute the commonly rehearsed statement that the keep was built on or across the Wall; the line of the Wall passes beneath Bowyer Tower into the Inner Ward to Wardrobe Tower (site) and so to Lanthorn Tower.)

LONDON WALL.—Paper by Mr. F. W. Reader and Mr. A. S. Kennard, read to the Royal Archæological Institute, on "Pile Structures near London-wall." In an excavation in the bed of the Wall Brook, on the street's north side, there were discovered, about 20 ft. below the surface, well-preserved remains of pile-structures of the Romano-British period that had served as supports for dwellings; the piles were 4 ft. to 6 ft. long, and 7 in. to 10 in. wide at the top, and joined up with planking. The large quantities of loose nails indicated that the superimposed dwellings were of timber. There were also discovered a remarkable enamelled bronze "fibula" (fish-shaped), many iron implements and tools, the sole of a "caliga," studded with hob-nails, a lead seal incised with "D.V.," pins of bone and bronze, red "Samian" and contemporary fictile ware, &c., together with a great many human skulls. (Dec. 13, 1902.)

ST. GILES WITHOUT, CRIPPLEGATE.—In digging beneath the Wall, an oval culvert of red brick—perhaps a drain into the ditch—in excellent state, was found. In 1477, the civic authorities repaired the fabric from there to Aldgate, and about the same time the Goldsmiths mended it from thence to Aldersgate. The battlements were removed from the Wall in the churchyard in 1803, *ex impensis* the parishioners. (Sept. 10, 1898, and Aug. 25, 1900.)

TOWER HILL.—Portion of ancient Wall of the City of London, George-street, Tower Hill, scheduled as a structure of "archæological or historical interest," to be controlled or maintained by H.M. Commissioners of Woods and Forests, is referred to. (Dec. 12, 1896.) (We take this to be the remains above ground in Trinity-place, Trinity-square.)

Views, by the late H. W. Brewer: "London in the time of Henry VIII," from the east, shows the Wall from the Tower to Bishop Gate. (Jan. 7, 1888.) "Grey Friars and New Gate," north-west angle, and two bastions of the Wall, the Ditch. (April 21, 1894.) "Ludgate in the time of Henry VIII," the Wall at Ludgate and Blackfriars. (Jan. 4, 1896.)

THREADNEEDLE STREET.—Mr. Herbert Jones' paper, read to the London and Middlesex Archæological Society, dealt with Roman remains recently discovered in the street, including a Roman bath, in cement, about 30 ft. below ground, beneath No. 62, and between the Sun and the North British Insurance Offices; photographs taken of the bath before its destruction were shown. (April 20, 1895.)

STRAND LANE, STRAND.—The white marble linings and old Purbeck pavements of the adjacent so-called "Earl of Essex's Bath," were used [1893] for lining the Roman Bath in Strand-lane, which was also repaired with the pavement of the former that stood in a house pulled down for the building of the larder of the Norfolk Hotel, Surrey-street, eastwards of the Roman Bath. (Nov. 10, 1894.)

LONDON WALL.—A stretch of the Wall, about 150 ft. long, was unearthed in the building of Blomfield House on the site of the Portuguese Synagogue, at the corner of Blomfield-street, in the spring of 1885. It was laid upon a foundation of large flints, above that a course of rough rag, then layers of tiles, about 1½ in. thick, next a course of rag stone, 2½ ft. deep, to nearly the ground level; a piece of the Wall eastwards from All Hallows-on-the-Wall church bounds the gardens of some houses in New Broad-street; the vestry of the church stands upon a bastion. (June 28, 1890; March 5, 1898; June 17, 1905; Sept. 2, 1905).

In excavating on the sites of Leathersellers'-buildings, Little Bell-alley, Cross Key-court, &c., for a new thoroughfare [Copthall-avenue] a pit or well, boarded, and filled with a store of earthenware vessels and a coin of Allectus, were found. By the Swan's Nest Tavern, in Bell-alley, was found a red-brick archway, 6 ft. high by 4 ft. wide, standing upon big elm-piles, 6 ft. long, driven into the natural soil over the Wall Brook, the total depth of the structure being 18 ft. below the ground level. In the black soil of the river-bed, abundant relics of the ox, *Bos Longifrons*, horse, sheep, goat,

and dog, with a finely-preserved skull and tusks of a boar, and many butcher's knives of the Roman period; a large *culter*, with vestiges of, as was conjectured, a slaughterhouse, were discovered. A similar archway was found in the making of the new Leadenhall Market. The article gives an illustration of one found, 1869, with a mosaic pavement, in Bucklersbury, built up of closely-jointed tile-worked walls upon blocks of chalk laid above the piles. (Oct. 5, 1889.)

OLD JEWRY.—A Roman cinerary urn of black clay was found at the west end of the site of St. Olave Jewry church. (Feb. 9, 1889.)

ALDERSGATE.—A length of more than 100 ft. of the substructure was revealed in clearing the ground for new P.O. buildings, and a deep trench, sunk to its base for an exploring party of the Society of Antiquaries, revealed the Wall, in good condition. It rests on a hard clay-bed. On a footing of three courses of stones, lies a plinth of three courses of large, flat, bright-red tiles, then a set-off of five courses of stones, capped with a double course of tiles; then another set-off of 2 in. with another five courses of stone, and band of two tiles, as before, the construction being repeated four times from base to summit. The masonry is of good, hard stone, like to Kentish rag, hammer-dressed, the core of similar stone, and all bedded solidly in hard gravel mortar, unmixed with pounded brick. In all the portions previously examined of the base of the upper and later fabric, the wall has been found to present uniformity of design and workmanship. (May 5, 1888; Oct. 1, 1887; May 12, 1888.)

WORMWOOD STREET.—Loftus Brock reports to British Archæological Association the removal of part of the Wall that had served as a foundation for the houses on the east side. Nearly opposite to St. Bevis Marks Synagogue, the foundation of a circular bastion of worked freestone and hot bonded into the wall, were found. (May 28, 1887.)

CHEAPSIDE AND WALBROOK.—Many relics discovered in various parts of the two streets were exhibited at a meeting of the British Archæological Association, including the marble bust of a young Roman lady. (March 12, 1887.)

LUDGATE HILL (SOUTH SIDE).—The demolition of the Cock Tavern for the building of Nos. 1–2, St. Martin's-court, at the corner of Little Bridge- [since Pilgrim] street, revealed some of the later wall. Migrating from High Holborn into what had just been constituted as the Ward of Farringdon Within, the Dominican, or Black, Friars obtained, 1282, licence to raze the superstructure of the Wall southwards, and to enclose their precincts with a wall westwards—largely built of the old material—down Pilgrim-street to the Fleet, and thence to the Thames-side near Water-lane. The King ordered the citizens to erect also a tower, or barbican, for his reception, next south to the Lud Gate. Holfar marks the tower's site on a plan. The tower was conspicuously depicted in Ryther's map, 1604, discovered after a fire in 1792; the remains were pulled down in the summer of 1889. (May 23, 1885; April 3, 1885; and June 15, 1889, with view of the tower.)

ALD GATE TO BISHOP'S GATE.—Excavations at the corner of Aldgate High and Duke-streets, revealed remains of the Wall across Duke-street and under Aldgate. (June 20, 1889.)

J. E. Price's paper to the London and Middlesex Arch. Soc., upon works for the Inner Circle Railway, referred to the discovery of a bastion, containing several sculptured stones, in St. Mary Axe. During the last few years, portions of the Wall, and of the four bastions, drawn in the Braun and Hogenburg map, by Hoefnagel, of London in 1560, Roman material in Camomile-street, John-street, America-square, and Castle-street, Bevis Marks, have been found. A sarcophagus, 8 ft. long, and some Roman inscriptions, were also discovered in Bevis Marks. (Nov. 22, 1884.)

CONSTRUCTION OF THE METROPOLITAN DISTRICT RAILWAY.—On the left bank of the Wall Brook, in Dowgate-hill, a landing-stage of Roman pavement, in tile, set upon timber piles with mortised jointing, was found. Another pavement, tessellated, was found in Trinity-square garden; and at Cloak-lane (site of St. John the Baptist Church), and at Bush-lane numerous remains were discovered. In Seething-lane, the arms of a bronze Roman statue of heroic size, with coins of Nero and of Vespasian, were unearthed; and to the south of Aldgate High-street two wells were found. (May 3, 1884.)

BROAD STREET.—A Roman pavement was discovered during excavations under the site of the old Excise Office. The pavement was completely cleared, and found to measure 28 ft. square. It was made up of bricks and squares, artistically combined to produce an ingenious whole. In the centre was a female figure on an animal, probably Ariadne. The pattern of the border was somewhat coarse. Although not perfect, the whole design was traceable, and the parts remaining were in good preservation. The colours were black, red, and white. Repairs with coarser tesseræ were observable. The pavement was 13 ft. below the street. Coins of Hadrian, who died in A.D. 138, were also found. (March 14, 1884.)

Mr. A. Hall's article on the evolution of London from primitive roadways, as a military necessity of the Roman occupation; British roads supplemented by Watling and Irmine Streets from the south-eastern ports through London to the west and north-west and north. (Oct. 13, 1883.)

SOUTHWARK.—At a meeting of the British Archæological Association, a Roman coin found in King-street was shown. In Dr. Rendle's paper upon the lake dwellings, the author testifies that Roman remains, tracts of handsome villas, mosaic pavements, and burial places have been found throughout the Borough, and particularly along the probable lines of the roads as in Gwilt's map. (March 3, 1883.)

ST. HELEN'S, BISHOPSGATE.—Constantine the Great, 306-337, founded the church in memory of his mother (tradition). (June 23, 1877.)

BLACKFRIARS.—A monument to Celsus, a *speculator* of the II Legion, was discovered (August 12, 1876.)

BUCKLERSBURY.—In excavation for the National Safe Deposit Co.'s premises, there were discovered, at a depth of 18-24 ft., coins of Claudius and Antoninus Pius, and each intervening reign; at 40 ft., in a trench in Charlotte-row, on the bank of the Wall Brook, an *area nalis*, or boundary mark, in an oaken case, 3ft. square on base and piling of second century. A similar *area nalis* was found here in 1835 on the stream's east bank. (January 22, 1876.)

WIMBLEDON.—In a letter, Mr. C. Cooke referred to Cæsar's Camp. He said that, although it was believed to be a Roman Camp, its circular shape was opposed to this theory. (May 25, 1872, p. 411). In a reply to Mr. Cooke, Mr. A. Hall said that Cæsar's Camp had been proved to be post-Roman, and was attributed to the Saxons. He drew attention to another, and older, entrenchment, called Amesbury Bank, situated one mile south of Epping; this was believed to be of Roman origin. (June 1, 1872.)

POULTRY.—In excavating in connection with the formation of a new street from the Mansion House to Blackfriars, a Roman tessellated pavement was discovered at the corner of Poultry. The pavement, which was in an excellent state of preservation, was 17 ft. below the surface. Foundations of Roman walls were also found. (May 15, 1869.)

This pavement was opened to the public for inspection for a time, and was to be taken to the City Museum. It was of a bold type and of geometrical pattern, with scrolls, circles and

The Fleet Ditch at Holborn Bridge. Looking South is Field Lane to right. From a Drawing made in 1841. (By permission).

interlaced squares, but with no figures of any kind. The tesseræ were of five colours. In shape, the pavement was a parallelogram, with circular ends, and had a wonderfully fresh appearance. (May 29, 1869.)

LOWER THAMES STREET.—A portion of a Roman building was found when the Coal Exchange was built, and further remains were discovered during excavations on the east side of the Exchange. The second portion included part of a hypocaust, and was at a depth of 11 ft. The hypocaust was nearly square, with a semi-circle added at one end. The piers were formed of square tiles, some of which were broken. Portions of Roman tiles, pottery, glass, tesseræ and vessels were also found. The article also mentions that Roman pavements, of large boulder stones, had been found in streets leading to Blackfriars at a depth of between 11 and 12 ft. Illustrations of the hypocaust and other remains are given. (June 11, 1859.)

LONDON WALL.—Long articles describing the course of the old Roman Wall, and various places where it had been discovered. A map and illustrations are given. (May 12, 1855; June 9, 1855.)

LUDGATE HILL.—Discovery of portion of Roman vessel in Ludgate-hill. Illustrated. (March 3, 1855.)

Paper by the Rev. T. Hugo, before the London and Middlesex Archæological Society, in the course of which it is stated that London was utterly unknown to the Romans at the time of their first invasion, but, from appearances, they probably entrenched themselves at Wimbledon during their retreat. (Mar. 8, 1856.)

TOWER HILL.—Fragments of the Roman Wall and Roman remains were found at Tower-hill. Besides pieces of masonry, there were found a stone with an inscription, and a part of a capital or ornament of Roman London architecture. (September 4, 1852.)

THAMES STREET.—A red tessellated pavement and the remains of a hypocaust were found during excavations at the Coal Exchange. The warm-air chamber of the hypocaust was 20 in. high, and consisted of a series of pillars, composed of 14 tiles, 8½ in. square by 1¼ in. thick, and placed 1 ft. 5 in. apart. The floor was paved and covered with large tiles 1 ft. 11 in. by 12 in., and 2 in. thick. The apartment containing the warming apparatus was semi-circular on one side, which projected beyond the outer wall of the other room, and had a recess in the wall with a seat for two persons. The discovery was made about 13 ft. below the level of Thames-street. (Feb. 5, 1848.)

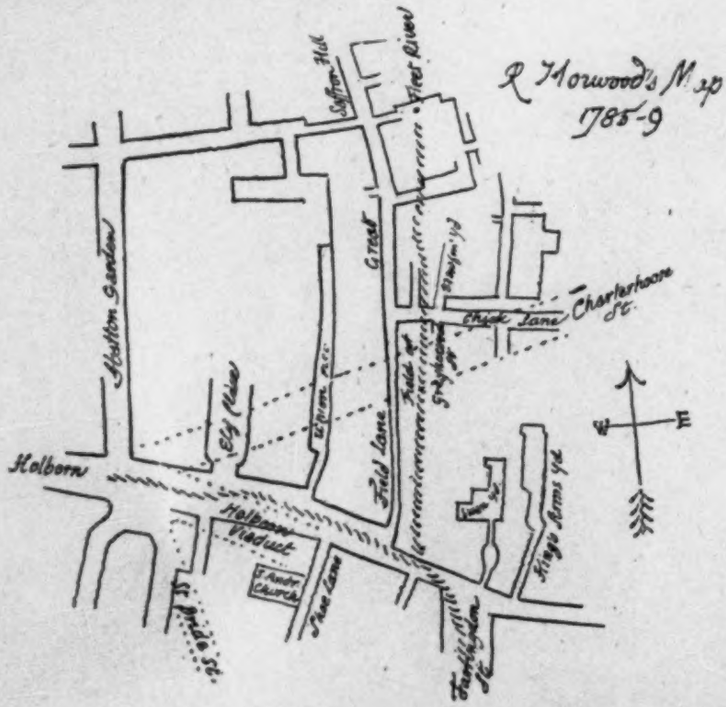
HART STREET.—A piece of Roman sculpture, representing the Deæ Matres, or Matronæ, discovered during excavations in Hart-street, Crutched Friars, was lying neglected in the City stoneyard. (Oct. 30, 1847.)

THE RIVER FLEET AND HOLBORN BRIDGE.

OUR Calendar for last year, issued with our number of January 3, 1919, gives a view of Ludgate *temp.* Henry VIII, reproduced from a drawing by the late H. W. Brewer. Therein we see Fleet Bridge, "a palace and a prison on each hand," with the stream flowing through Holborn Valley, and so between Bridewell and Blackfriars into the Thames. We now show how it appeared, black, pestilent, obscene, eighty years ago at Holborn Bridge, and between Field, formerly Gold, Lane (to right of the spectator looking southward) and Field-court (to west), and Greyhound-court (to east), where is now the north section of Farringdon-street.

In terms of the Act of 1670, 22 Car. II, c. 11, for rebuilding in the City, Wren reconstructed and widened the bridge—its span was about 10½ ft.—when he made the "New Canal thence to Bridewell Dock. On the parapet plinth-course was cut the Lord Mayor's name [Sir] William Hooke[r] [A]nno D. 1674."

In his large-scale Survey of the River Fleet Sewer, 1817 (*penes* the L.C.C.) John Ogle fully describes the section, and says that the side wall he draws is 12½ ft. deep to the water surface, and that many drains flow out of it over the stream. In that day stood on the banks the yards and shops of slaughterers, offal dealers, tripe and gut dressers, glue makers, &c., who found in that ditch a convenient discharge for their noisome refuse. And around in Chick-lane (since Upper West-street), Field-lane, Field-court, Greyhound-court, Swan-yard, as in Horwood's big map of 1795–9, were the Old Red Lion in Chick-lane, and other notorious taverns, flash kens, thieves' kitchens, receivers' dens and the like that made the locality an opprobrium and a reproach; see also "Oliver Twist," J. W. Archer's "Vestiges of Old London," 1851, *passim*. The drawing is reproduced from one made in 1841 by, we believe, Archer, for Anthony Crosby, whose unique collection for the story of the Fleet is in the Guildhall Library.



OLD WYCH STREET.

MANY of our readers will remember the north side of the Strand, between Wellington-street and St. Clement Danes Church, as it was twenty-five years ago, and the streets with their numerous courts and alleys in the rear. Among the latter were Wych, Holywell, and Newcastle-streets, and the south ends of Catherine-street and Drury-lane. The long curve of Wych-street and Drury-lane ran from Butcher-row, Strand, and the Foregate, Clement's Inn, to the junction of Broad-street, St. Giles-in-the-Fields, and High Holborn, where, in the then main road to the West, stood the Aldewych Cross. The name of the Danish Ealdwic village survived in that of Oldwick Close in the Stuarts' day, now the site of Peabody-buildings (1880-1), Drury-lane. In 1877, the late Metropolitan Board of Works applied the provision of the Artisans' and Labourers' Dwellings and Improvement Act, 1875, to the Drury-lane insanitary area. Their successors in 1889—the London County Council—extended the clearing of sites to the Clare Market area, and eventually, for re-housing purposes, merged the Board's projects in their scheme for a new road, Strand to High Holborn.

Newcastle-street, traversing Wych-street, entered the Strand eastwards of St. Mary-le-Strand Church. On the north side of Wych-street (western portion) Philip Astley built his Amphitheatre, 1805-6, taking for its site, in part, Craven Buildings, which had supplanted the house erected by Sir William Drury, which devolved upon the Cravens. The middle of Aldwych roadway, opposite the opening into Kingsway, passes over the site of the stage. Between Wych and Holywell streets stood Lyon's Inn, an Inn of Chancery, belonging to the Inner Temple, converted, *temp.* Henry VIII, from a hostelry by sign of the Lion. Coke and Selden were members; the hall (1700) was the first home for some years of the Architectural Association. Over the quadrangle was built, 1868, the Globe Theatre, entered from Newcastle-street, and to the east, 1870, the Opéra Comique, entered from the Strand. Nearly all the north side of Wych-street consisted of some of the buildings of New Inn which was originally a travellers' hostelry, known as the Inn of Our Ladye, from its sign of the Virgin. Sir George Buc relates that Lord Chief Justice Sir John Fineux acquired the guest-house *temp.* Edward IV for some law students. Early in the 18th century the buildings of New Inn were extended around the spacious inner garden; the materials of the hall and fifteen houses were sold in March, 1903. Holywell-street, once renowned for its mercery shops, latterly became an emporium for old clothes, old books, and low publications. It is in Holywell-street that Rafael Mendoza entertains Lord Codlingsby—see one of Thackeray's "Novels by Eminent Hands." The half-timber and plaster houses, with some on the south side of Wych-street, were of the 16th-17th century period. The Rising Sun Tavern, Wych-street, and the adjoining house in Holywell-street, at the apex facing eastwards of the two streets, were older than Edinburgh Old Town; they were contemporary with The Grange and Boshams, with the Angel and the One Bell inns, with Holy Ghost Chapel, Strand, and the windmill at the top of Milford-lane; they witnessed the rise and fall of Wren's Temple Bar, and the demolition of Strand Inn and Bridge, and St. Ursula-le-Strand, for the building of Somerset-place.

One generally reads that Holywell-street was named from the famed St. Clement's Well (in Clement's-lane). Yet that does not seem to be the case. The Ordnance Survey, 1874, marks "Site of Holy Well" at the middle point of the east wall of the Opéra Comique, between Holywell and Wych streets. In "Things I have Seen," 1894-5, G. A. Sala says that in 1852 he saw cleared out, behind the Old Dog (*sic*), No. 24, Holywell-street, an old well containing a lot of things, amongst them being a memorandum, in faded ink, "Dr. Goldsmith, 13sh. 10d."

THE SMOKE EVIL.

A CORRESPONDENT writes:—

"SIR,—It is strange, but true, that the gravest evils are often accepted and submitted to with the least resistance. One of the outstanding evils in this country to-day is the dense pall of smoke which overhangs all our large towns and cities. If we think about it and examine its effects, we are surprised that we have not been stirred to definite action. There is a Smoke Abatement Society, it is true, but its officers tell us that trying to rouse up the British people is like crying out upon the wilderness. Factory chimneys continue to belch forth unnecessary tons of filth, whilst from the chimneys of the homes thousands of columns of grey soot ascend to join the dense cloud overhead. This cloud serves as a perpetual blanket between us and the health-giving rays of the sun, those beneficent rays, which, but for the obtuse stupidity of man, would give us free of charge what hospital sufferers receive at 'great price' to cure hitherto incurable ills.

"Some days are clearer than others; there are, in fact, all stages between the thick, yellow 'London particular' of old and the light film of a dry summer day, but the cloud is always there. Anyone who has travelled in the United States must have been struck by the wonderfully clear air of New York. We in this country have come to regard the smoke pall as an inevitable adjunct of city life, yet in the chief city of the New World there are all the conditions of a thickly-populated, live, modern city without perceptible smoke. The New York man enjoys his daily sun-bath and the streets of New York are—at least during the summer months — bathed daily in germ-destroying, sterilising sunshine, whilst in London, the most sanitary town in the world in all other respects, this beneficial agent is deliberately cut off. Surely this should give us 'furiously to think!' If New York, with its inhabitants, can enjoy pellucid air, why should not London? There is nothing to prevent it beyond an established custom and the natural change-resisting stolidity of the British character.

"We burn in our factories and houses soft-bituminous coal in its crude state; our fathers burnt coal in the same way, and the old conservative form of reasoning that what was good enough for our fathers is good enough for us is still upheld. There is no reason whatever why this soot which passes into the air and serves to deprive us of necessary light and warmth should not be retained and diverted to a useful purpose. The soot which is thrown into the air and later descends upon our houses, public buildings, persons and vegetation, to the detriment of all, is composed of valuable chemicals.

"There are several forms of clear fuel: anthracite coal, oil, electricity and gas. Of the first we have not that abundant supply which has enabled New York to keep warm yet clean; oil is inconvenient, and electricity as a heating agent, by reason of its present high cost, is only for the wealthy. In gas, however, we find the practical solution of our difficulty. The products of combustion of gas fires have no deleterious effect on the atmosphere, yet we, as a nation, allow this matter to 'drift.'"

"MORE SUNSHINE."

An Architect's Estate.

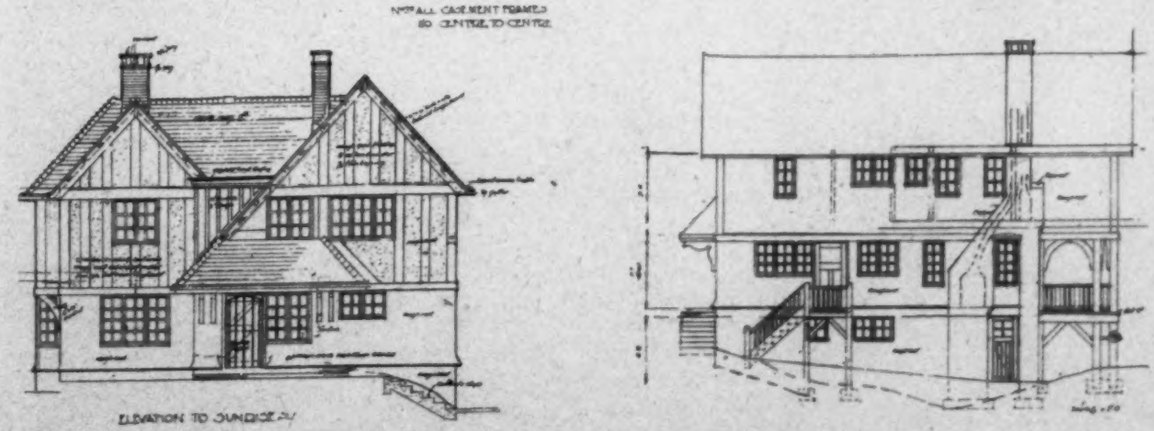
The late Mr. Samuel Perkins Pick, F.S.A., F.R.I.B.A., of Leicester, left estate of the gross value of £14,059.

10,000 Miles Benzole Test.

In the 10,000 miles road test of benzole, conducted by the Automobile Association, the lubricating oil used was Vacuum A, which gave complete satisfaction; the amount burned being 5 gallons 3 quarts, or 1,730 miles per gallon. No physical effects of any sort arising from the use of benzole were observable throughout the motor in the lubricating properties of the oil.

Egyptology at Liverpool University.

Mr. T. E. Peet has been appointed to the Brunner Chair of Egyptology at Liverpool University. Mr. Peet has taken part in several important archæological investigations—in the excavations of the British School of Rome in Malta (1908–9); and in 1909 in those of Wace and Thompson in Thessaly. In 1909 he was appointed Pelham student in the British School of Rome. In the same year Mr. Peet also entered upon Egyptian archæology, assisting in Professor Garstang's excavations of that winter. The following season he was invited to excavate for the Egyptian Exploration Fund at Abydos.



Residence at Shoal Bay. MR. BRYANT NEWBOLD, Architect. (*See* p. 26).

AMERICAN FRAME CONSTRUCTION.—I.

By BRYANT NEWBOLD.

Over seven years ago the writer returned to England after having spent ten years in the United States and Canada, and, whilst loving his own country, he could not close his eyes to evidences on every hand of a preference for things behind the times and customs sadly out of date. Fired with an enthusiasm for certain methods he had learned, and with definite plans and figures, he visited those contractors whom, in the past, he had known as progressive. Matters went well until he mentioned that he had been in the United States—a veil then spread over the faces of his listeners, and he felt that he had been indiscreet in speaking of things that were not mentioned in polite society. The proposal dealt with reinforced concrete and its adaptability to small house construction. Some did go so far as to suggest: "But have you ever seen it used before in this country?" And one, more venturesome than all, stated that he had considered the subject, but had found that the cost of the wood "shuttering," which could only be used twice, was prohibitive in small buildings.

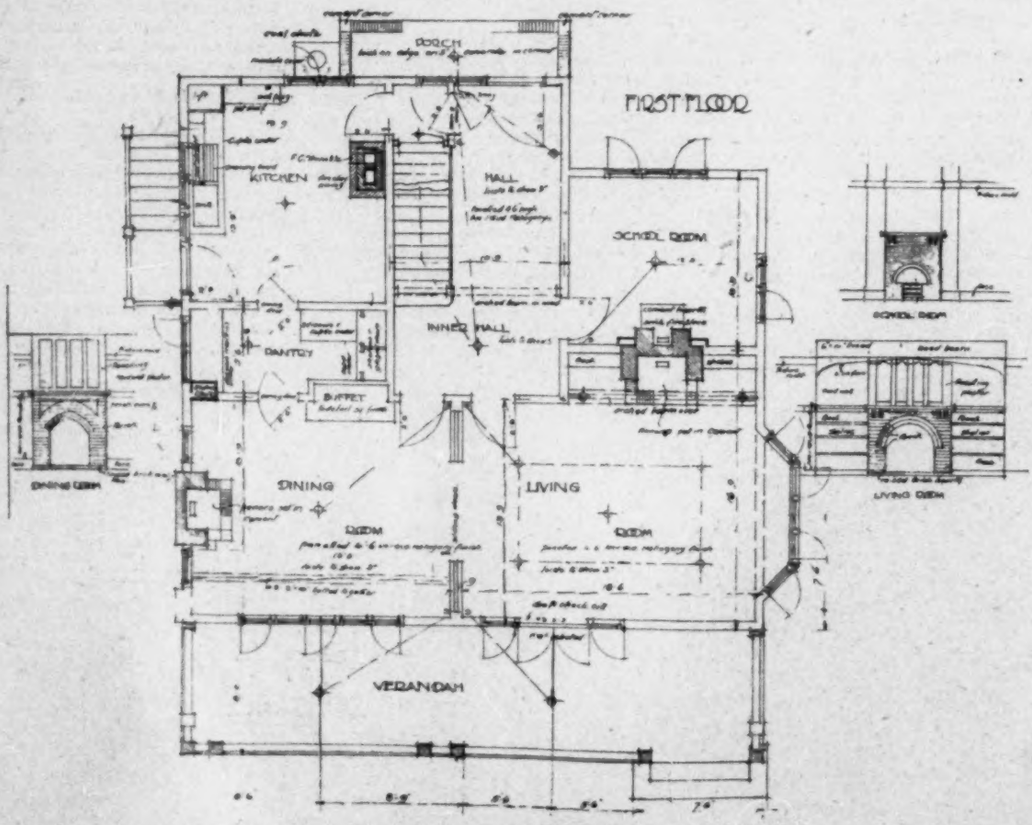
After many such abortive interviews, balked by British bulldog obstinacy, the writer withdrew from the unequal contest, became re-Anglicised, and slept the sleep of security surrounded by 3 ft. stone walls, achieving a most respectable lumbago from the damp which penetrated. He grew accustomed once again to have his knees scorched while his back shivered, to bathe in an ice-cold bathroom in tepid water during the less happy moments of his monumental herculean range, and at night the water froze in his bedroom—all reminding him that he was again in Merrie England, insular and prejudiced. Then, arousing, came the war, which, amongst many awful results, awakened a self-satisfied nation to the fact that there were other people in the world.

Quick to realise the tendency, the Government created yet another Ministry—that individual initiative might be suppressed. And this, after twelve months' superhuman labour, gave birth to one cottage. Then, lastly, the long-suffering, or "stunted," public awoke and cried: "We want houses, not plans," and piercing the general hubbub and clamour of irresponsible suggestions came a voice, saying, "Why not use a material known as reinforced concrete?" whilst a most progressive, when not destructive, journal discovered that "wooden" houses could be built, and added naively that it believed that some such experiment had been made in America. Therefore, after seven years—and such years—it may be that England is at last ready to learn of revolutionary building methods, and it is with this in view that the writer offers the following suggestions, dealing with American frame construction, and a more convenient planning of the home in which, as is now more openly acknowledged, the inmates are increasingly obliged to perform their own domestic duties; and without wishing to labour the point, to declare that it was this very condition of affairs which gave rise to the American type of plan as distinct from our own.

To begin, therefore, with our two discoveries, "Reinforced Concrete" and "Wooden Houses," the obvious is to see if either or both of these may be used cheaply and effectively in the present emergency. The question of durability will not be discussed, for experience will tell in this country, as it has done in the States, where there are now standing "wooden" houses in Salem, Massachussets, built, if not at the time of the Pilgrim Fathers, very soon after that date. And it is felt that such durability should meet the average needs, and certainly outlive the present scandal; for scandal it most assuredly is that those who, having fought for their country, should, on their return, be faced with no alternative but a tent in the woods or a gipsy caravan.

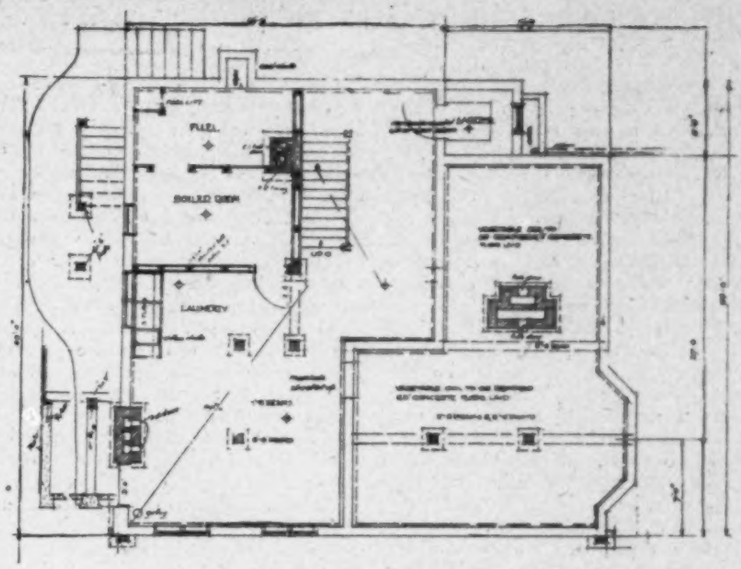
The obvious objection of the ignorant to "wooden" houses, by which it is presumed is meant frame structures sheeted in wood, is their supposed lack of durability—that to reinforced concrete has already been touched upon. But the obvious reply to both is, "Why not combine the two?" Erect a frame structure and sheet it with reinforced concrete. And, in illustration of such a possibility, drawings and photographs are shown herewith of houses erected by the writer in Victoria, British Columbia, where the climate only differs from ours in that its extremes are accentuated. That which has been found weatherproof in the one should, therefore, serve in the other. It is proposed to show how the two may be combined, and to give certain details of a cheap, but effective construction, together with some very decided improvements in planning whereby much domestic labour may be saved.

The house illustrated was built on Uplands Estate, in Victoria, B.C. The contour of the site was such that very little excavation was necessary to permit of the ground floor line,



Residence at Shoal Bay.
Mr. BRYANT NEWBOLD, Architect.

known as the first floor to American architects, resting at our customary level above the ground, whilst at the other end under the kitchen was space for a comfortable basement. The latter is the essence of the American plan, in that there is contained the furnace or boiler for the comforting central heat. Upon the foundation walls, built from stone excavated on the site, a 9 in. by 3 in. plate is halved and bolted at intervals. Into this plate are tenoned the 4 in. by 4 in. angle posts, and 4 in. by 2 in. studs set 16 in. apart, and on it, nailed thereto, rest the 7 in. by 2 in. ground (first) floor joists. The upright studs are in one length from the plate to the ceiling level of the bedrooms, where they are capped by two 4 in. by 3 in. plates over which are birdsmouthed rafters and on which rest the ceiling joists. The bedroom floor joists are nailed to the upright studs and to a 7 in. by 2 in. ribbon, which may be housed into the studs or simply nailed thereto. Thus is very quickly erected the frame structure, the outside of which is then sheeted diagonally with 1 in. rough boarding, window and door openings being cut away for and framed as in our stud partitions. Upon this is placed a good waterproof building paper, over which are nailed 2 in. by ¼ in. battens vertically at a certain fixed distance apart. Inside the studs are lathed and plastered as at home.



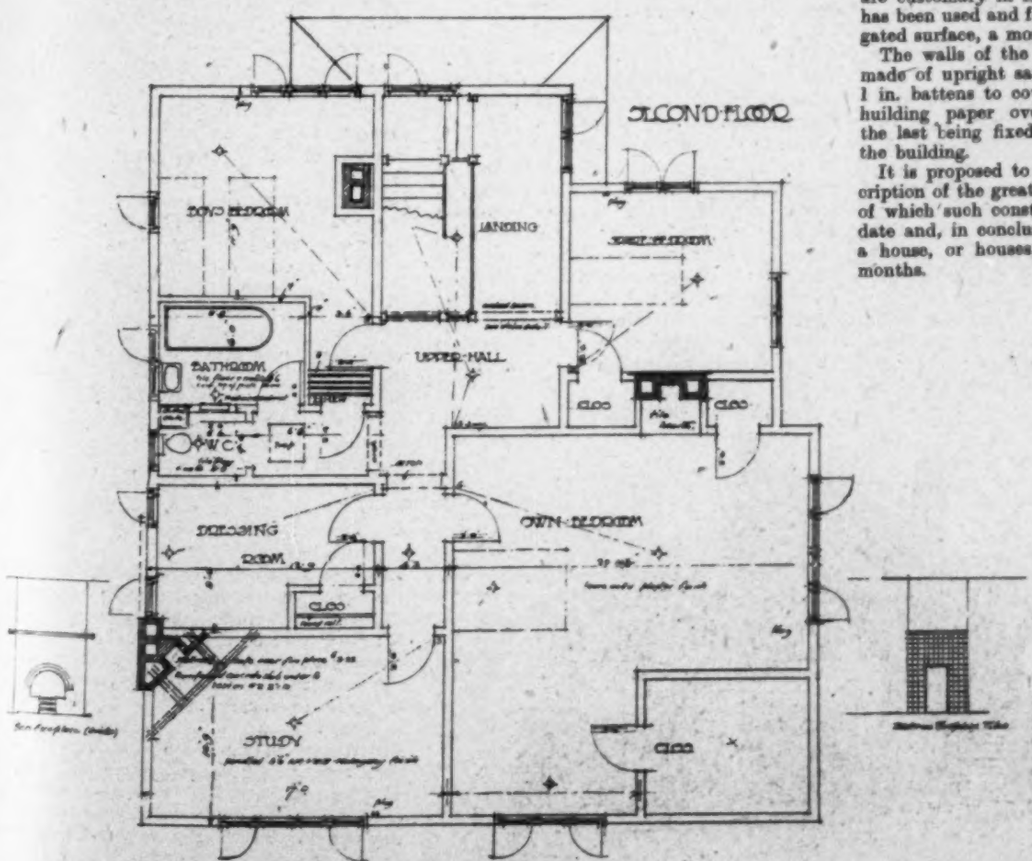
Residence at Shoal Bay.

So much at the present for our "wooden" house; now to cover it with a coating of reinforced concrete. It has become our custom to think of this as necessitating heavy construction with stout rods ½ in. thick, all duly barred and wired, but as our concrete is not weight supporting, but merely a weather-proofing, the lighter it may be the better and the cheaper. After some research and experiment with reinforced blocks, slabs and concrete bricks, all too thick and costly for the purpose, and involving much labour and dissatisfaction in the jointing, and difficulties as to door and window openings, it was found that a concrete mixed upon the site and plastered upon the walls formed on setting a more homogeneous mass than any block or slab system. And, further, a plastic substance such as this permits, at the time of erection, of any external finish that may be desired. It was necessary, then, to find both for reinforcement and as a key some material which would be improved and strengthened by the application, and for this purpose expanded metal lathing was used, the strips of which were nailed vertically to the vertical battens, over this and pressed well into the interstices was the ½ in. thick concrete, forming an impervious, monolithic slab, which after a few weeks defies even a sharp pointed pick.

We have here the most perfect kind of damp-proof wall, which cannot truthfully be said of any brick or stone wall ever built; for there is first the lath and plaster over the stud partition, forming a 3 in. hollow air-space, then the waterproof building paper or, in better-class work, some stouter bitumen product. Again, an air space and, lastly, our reinforced concrete slab without a joint in its entirety, and which may, in its plastic condition, be moulded to any degree of rusticity and stained permanently with any desired vegetable colour. As to roofing, whilst red wood cedar shingles are customary in America, a similar concrete has been used and found to give, with a corrugated surface, a most pleasing effect.

The walls of the small square bungalow are made of upright sawn fir slabs with 3 in. by 1 in. battens to cover joints; under this is building paper over rough 1 in. boarding, the last being fixed diagonally as a brace to the building.

It is proposed to enter into a detailed description of the greater convenience in planning of which such construction permits at a later date and, in conclusion, to re-assert that such a house, or houses, may be erected in two months.



Residence at Shoal Bay.

THE HOUSING SCHEME AND INCIDENTAL MATTERS.

By "AN INTERESTED OBSERVER."

THE housing scheme hangs fire. The Prime Minister has set more than one of his able and energetic colleagues to galvanise it into operation, but after months of strenuous effort it still appears to hang fire, and, although the Press has lent its powerful assistance, there is but small progress. Legislation and organisation, declamation and persuasion, all combined have failed to awaken enthusiasm or vigour in development. The Government and the Press appear to be in earnest, but those for whom the houses are intended seem to be the most indifferent; they offer no facilities either in reducing cost or accelerating progress. The municipal authorities have been pushed and cajoled, but many still hang back, with a reluctance born of misgiving, and those who have moved forward have done so with obvious uneasiness.

It is true that many people who are always out to get something for nothing have cheerfully voted for cottages galore—at other people's expense—but even these are beginning to have serious apprehensions, if not a wholesome dread, that somehow or other they will in the end have to contribute their share, directly or indirectly, to the inevitable loss. The latest move has been to hang a new bunch of carrots in front of the quadruped in the shape of £150 bonus per house, but if the economic value of a house, as determined by the rent it will produce, is about £500 and the cost £800, then the bait of £150 is not particularly attractive.

Now what are the real causes of this situation, which has been indicated with an accuracy which, if not absolute, is approximately so?

1. The first cause of the dearth of houses is the Finance Act, 1910. The inevitable effect of that legislation has been so clearly and conclusively indicated publicly by Mr. A. A. Hudson, K.C., that it is unnecessary to make further reference to it here. Legislators are but human, and whatever their motives may be, and however accurate they may be in forecasting immediate effects, they frequently fail most lamentably in realising the after effects of their legislation.

2. The second cause is the inequitable legislation, which has continually penalised one small section of the community ever since the outbreak of war more than five years ago.

Although every £1 Treasury note has been worth less than 10s. in its purchasing power, and every other section of the community has (so far as the law is concerned) been allowed to adjust their charges to the altered circumstances, yet the owners of the smaller house property alone have been selected by legislation to suffer the full burden of loss arising from the universal increase in prices without relief or redress. (As is not unusual, such injustice is recoiling on the heads of those who perpetrated it; it never pays in the long run to act unjustly). It is true that the profits of others have been regulated by law, but in this case there is little or no question of profit, for the appalling cost of repairs has in most cases absorbed the greater part of the rents, and any pre-war standard has "gone by the board."

No one can wonder that men are scared at the prospect of building workmen's cottages, for the unfortunate owners may at any time be sacrificed in the future, as they have been in the past, for the sake of the popular vote. When once an act of this kind has been done it makes everyone nervous and apprehensive for the future.

The dearth of workmen's cottages is the direct creation of the Legislature, and the offer of the £150 bonus is only a belated, futile, and inadequate effort to compensate for wanton injury—a pitiful endeavour to undo that which never ought to have been done.

After having ruthlessly cut away the roots of the tree, the Government is eagerly striving to make it grow by watering it with chemical fertilisers or other artificial means, but their efforts, though exceedingly costly, are not very hopeful, for natural and healthy growth has been forcibly arrested.

Incidentally one may remark that the Government recently proposed to create a famine in coal by a similar process to that by which they have created a famine in houses, viz., to arrest natural growth, a policy combining the maximum trouble with the maximum cost; one would have thought that a single experience of this kind was sufficient for one generation. Even now it would take a bold optimist to open up new coal mines in view of past experience; enterprise which is essential to the welfare of the nation has been killed. It is a fatal policy.

3. The third cause is the fact that employers in the building trade have elected to pay 1s. 8d. per hour for unskilled labour, coupled with a promise of 1s. 9d. later on, in place of the pre-war rate of 8d. per hour.

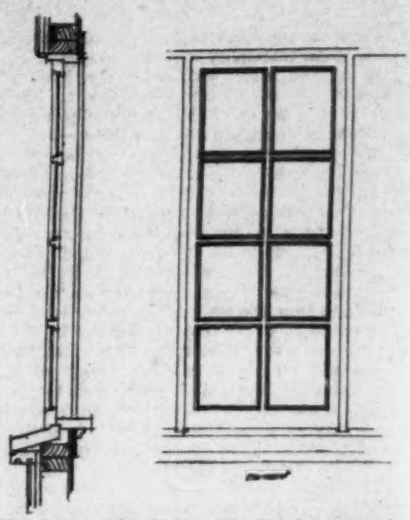
Builders have been heard to explain that this does not matter, for it costs *them* nothing. The former statement is false, but the latter is true, for most contractors in the building trade are now in the fortunate position of being able to pass this (or any other increase they may give) on to the long-suffering community (and conceivably in some cases increasing their own profit thereby), simply because their own industry is happily free from foreign competition, otherwise it is very doubtful whether rates of 1s. 8d. or 1s. 9d. for unskilled labour would have been obtained.

But although builders may not (for the time being) suffer anything, yet all other industries, as well as the community in general, are inevitably beginning to suffer acutely, for it is impossible to set up a standard of 1s. 8d. to 1s. 9d. for unskilled labour without affecting every trade in the kingdom, and also the cost of every manufactured material, both in the building trade and elsewhere.

The rate of pay for unskilled labour is a basic rate common to all industries, and when the Master Builders announce that they were prepared to pay any able-bodied man (from any other trade, or from no trade at all) 73s. to 77s. for a 44-hour week, the effect upon the nation's industry is so far-reaching that one hesitates to indicate its full extent; but one may say generally that from the agricultural labourer to the bank clerk (or *vice versa*), all alike are affected, as well as the national exports and imports.

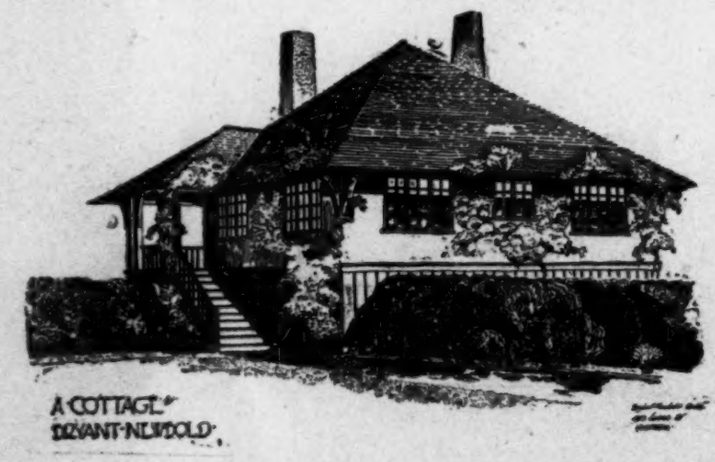
In the meantime 1s. 8d. to 1s. 9d. for unskilled labour is effectively holding up the already crippled housing scheme, for it will need a prodigious subsidy to surmount the present appalling cost of building operations, and it is doubtful whether any Government would dare to make adequate proposals to that end.

There is something grimly ironical in the situation when a scheme intended to provide from public funds a large proportion of workmen's rents is, to a great extent, crippled by the demands of the workmen themselves. There may be some solution to the present problem, but it is exceedingly difficult to imagine what it can be.



Residence at Shoal Bay (details of casement).

(*See* p. 26.)



A COTTAGE. DEVANT-NEWBOLD.

ARCHITECTURAL SOCIETIES.

THE ROYAL INSTITUTE OF THE ARCHITECTS OF IRELAND.

THE annual general meeting of the Institute was held on December 18, at 31, South Frederick-street, Dublin, the President (Mr. W. Kaye-Parry, F.R.I.B.A.), in the chair. The following have been elected Members of Council for 1920: Messrs. J. H. Webb, F. Hayes, R. H. Byrne, F. G. Hicks, A. G. C. Millar, E. Bradbury, R. M. Butler, G. L. O'Connor and S. M. Asklin, with Mr. Geo. F. Beckett representing the Architectural Association of Ireland.

Mr. P. J. Lynch, in proposing the adoption of the report, said the increased membership was an encouraging feature. A great step had been achieved in the work done in obtaining a standard of efficiency for those employed in housing schemes throughout Ireland. Mr. C. Hoffe Mitchell seconded, and the report was unanimously adopted.

The retiring President (Mr. W. Kaye-Parry), in his valedictory address, said that the Joint Council of executive professions, recently constituted at the suggestion of the President of the Institution of Civil Engineers of Ireland, was a welcome augury of improved and more harmonious relations between architects and civil engineers in the future. There was no necessity for any jealousy between two bodies engaged on constructional work. Architects could co-operate advantageously with engineers and the latter could seek inspiration in æsthetics from their architectural brethren. When architects knew that a cottage which was built for £218 in 1904 would cost £677 in 1920, they would recognise that the altered conditions necessitated the adoption of many kinds of improved methods of building. As the industries of the country were developed, the architectural profession would find profitable occupation in erecting homes for the workers and public buildings for a prosperous and wealthy nation.

Annual Report.

Membership.—The eightieth annual report of the Institute states that the number of registered members is 97, of whom 32 are Fellows.

Scale of Charges.—The Revised Scale of Charges approved by the Royal Institute of British Architects was submitted to the Council, and it was found that a strong difference of opinion existed as to the desirability of interfering with a scale of charges which had become universally recognised. The Council circularised the allied societies on the subject, of which six generally approved and one opposed the revision, while one offered no definite opinion.

Training Ex-Service Men.—A District Directorate of the Appointments' Department, Ministry of Labour, was appointed in Dublin to deal with the training of demobilised officers and men, and the President was nominated to act on the District Selective Committee. The Department was prepared to allow £50 per annum for each year of pupilage up to three or four years, and the Council considered this figure should be adopted. They also thought that the cost of the training of the trainees at art and technical schools and at the Architectural Association of Ireland should be defrayed by the principal out of the premium, and that the trainee should at the earliest possible stage of his training be given a small salary. On October 6, the Council was informed of a decision by the Ministry that no premium would be paid to architects accepting ex-Service men as pupils, as the Treasury held that the active service given to the country by these candidates should be regarded as an equivalent to premiums. The Council felt that, while the Treasury defrayed the fees of candidates who receive training in other professions by attending universities and colleges, it was unreasonable to withold a fee in a profession for which training must be received in the office of a qualified architect. In view of the fact that there seems little prospect of the Appointments' Department being in a position to honour their obligations, the Council has recommended members with whom trainees have been placed to accept the situation as far as lies in their power

Architects and Housing Schemes.—As the result of an interview between the Hon. Secretary of the Institute and the Chief Secretary for Ireland, a clause was inserted in the Housing of the Working Classes (Ireland) Bill, 1919, to the effect that the Local Government Board may make rules for carrying the Housing Acts into effect and for prescribing the duties, conditions of employment and qualifications of persons employed by local authorities in the execution of those Acts, provided that any rules with respect to the qualifications or conditions of employment of architects to be so employed shall be made after consultation with the President of the Royal Institute of the Architects of Ireland. The Council feels that this will be of ultimate benefit to the whole architectural profession in Ireland, and will tend to safeguard the industrial classes against badly-designed and ill-constructed houses.

Co-operation.—The Institution of Civil Engineers of Ireland having proposed a Conference on questions of Reconstruction, a deputation was appointed to represent the architectural profession upon a Committee which includes representatives of the engineering and other structural professions, and which will keep in touch with schemes of reconstruction, so that the interest of the public and the professions concerned may be safeguarded.

The Council of Public Health.—When it was learnt that the Government proposed to establish a Council of Public Health for Ireland, the Council submitted a resolution requesting that an architect should be appointed upon the Council, and a reply has been received stating that when the first vacancy on the Public Health Council occurs the claims of the architectural profession will be fully considered.

Architectural Prize.—The prize of £10 10s., offered by the Institute to the members of the Architectural Association of Ireland, was won by Mr. C. P. MacNamara, the assessor being Mr. T. J. Byrne, A.R.I.B.A. The Council has again offered the prize for competition in the present Session, the assessor being Mr. E. Bradbury, and the subject, "A Block of Offices and Shops."

The Architectural Association.—The Council notes with satisfaction the ever-growing utility of the Architectural Association, and considers that the policy of the Association in preparing members for the Studentship Examination of the Institute will add greatly to the cordial co-relationship which exists between the two bodies. Mr. G. F. Beckett, President, has been elected to represent the Architectural Association on the Institute Council.

War Memorial.—The attention of the Irish National War Memorial Committee has been drawn to the desirability of instituting a competition before a design is selected. It is now understood that the Committee intends to pursue this course.

The Professional Practice Committee.—This Committee, in addition to drafting the conditions of contract, have dealt with the subject of training in professional practice, and is also considering the questions of the ownership of architects' drawings and of undisclosed commissions.

The Ancient and Historic Buildings' Committee.—This Committee has had the subject of the condition of the Casino, Clontarf, again under review, but no solution has been arrived at.

The Formation of Branches.—A number of architects in Cork are proposing to form a local society as a branch of the Institute, membership to be confined to registered members of the Institute. The Council is considering the practicability of establishing a branch of the Institute on similar lines in the North of Ireland.

On the retirement of the President, Mr. W. Kaye-Parry, the Council wishes to express its sense of the strenuous activity, zeal and ability which he has displayed in directing the affairs of this Institute during the past three years. The Vice-President has signified his intention of retiring from the Institute after a connection of nearly forty years, during which time he has done much to advance the interests of the Institute.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.

Building Materials and Traditions of Snowdonia

AT a meeting of the Association on December 19, the President (Mr. H. T. Buckland, F.R.I.B.A.) in the chair, Mr. Harold H. Hughes, A.R.I.B.A., delivered a lecture entitled "The Local Building Traditions and Materials of Snowdonia."

The lecturer pointed out that the climatic conditions had a great effect on the design of buildings and the choice of materials. The storms in this quarter were very severe, and it was difficult to describe their tremendous powers of penetration.

The earliest form of dwelling, and one which was in existence at the time of the Romans, was a kind of circular hut, although the circular plan was not invariably adopted, but often varied to an oval or pear shape. These dwellings were provided with neither light nor ventilation, and the smoke escaped at the doorway. The diameter varied from 10 to 20 ft., and sometimes larger. As time went on a house, rectangular in plan, was introduced. It consisted of one room with an ingle and fireplace on one of the end walls, and invariably had its doorway on one of the side, or longer, walls. The walls were very low; the roof often sloped at 100 deg. and was nearly always thatched. The roof trusses were formed of oak, and were mostly in one large curved piece. The floors were formed of beaten clay, and after much wear these floors lent themselves to a polish, and in more than one instance had been blackleaded.

The early churches were simple rectangular buildings and oak and wattle were chiefly employed in their construction. The same plan was always adopted by the church builders of the period. The rood screens in the Welsh churches had a character of their own, and were beautiful in design.

Few Welsh towns or villages were pleasing in themselves, but they harmonised admirably with their environment, and seemed to fit into the landscape much as a portion of a jig-saw puzzle.

In designing dwellings to suit these surroundings, the architect was faced with innumerable difficulties, the battle with the elements defying him to the very utmost. Some of the old walls were built 3 ft. 6 ins. thick with a 4½ in. brick wall on the inside, the apperture being filled with bran, in an endeavour to keep the house dry, but the weather actually penetrated this. The evolution of the "step ladder" to the sleeping loft was a narrow stone staircase, which started on the ground floor from a position adjacent to the ingle, or at the extreme gable end of the building. Dormer windows were introduced at the end of the seventeenth century.

In the eighteenth century the walls were built high enough to permit of an upper story, with its ceiling level coincident with the eaves. Granite or slate rock were very plentiful and much used. The slate was procured in large sizes and was admirably suited for the purpose. Granite was often put into the walls in roundish-shaped boulders, but the joints were large and by no means weather-proof. A good deal of "coursed work" was also employed, the courses being large at the base and diminishing toward the gables. Stone slates took the place of thatching, and the spaces between and under the slates was often filled with moss and clay. Tiles were not very extensively used, and in many cases were placed alternatively, red and black, producing a very chequer-board-like appearance.

The thing aimed at in Wales seemed to be simplicity of treatment, and this, together with the majestic, yet simple, splendour of the surroundings, produced a restful harmony that would appear astonishing and paradoxical among these huge mountains.

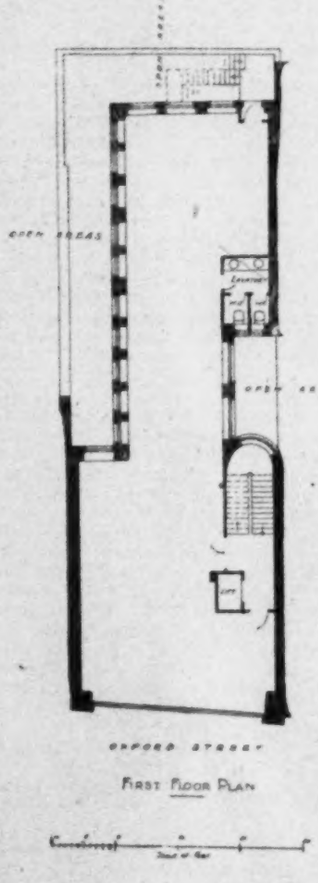
A vote of thanks to the lecturer was proposed by Mr. Doubleday, seconded by Mr. Cotton, and passed unanimously.

No. 299, OXFORD STREET, W.

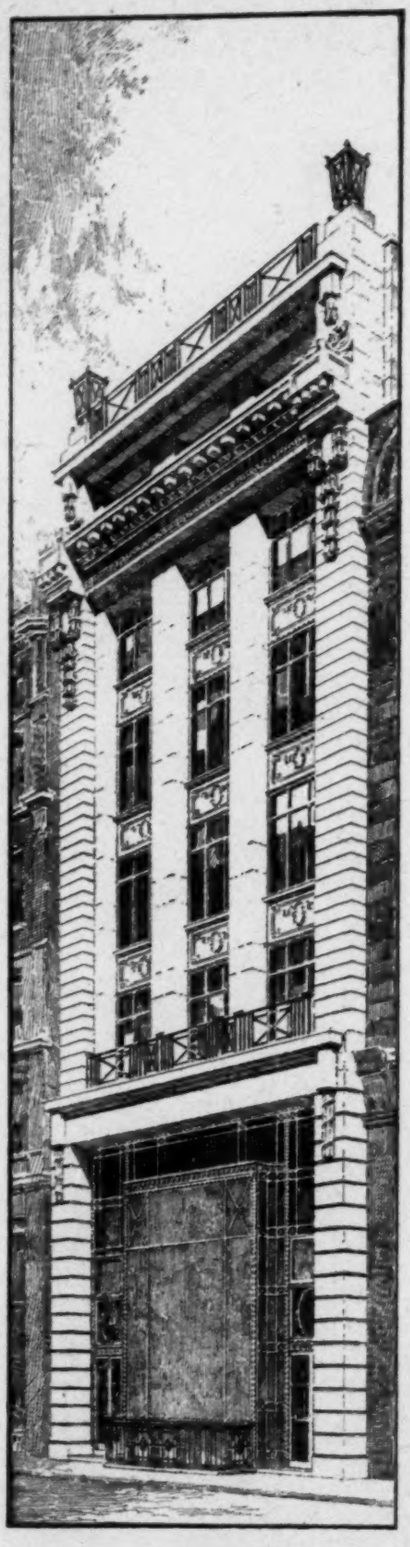
THIS building, designed for the occupation of Messrs. E. Pollard & Co., Ltd., and Messrs. Reville, Ltd., occupies the former site of the headquarters of the British Medical Council, the foundation stone of which, laid by the late Prince Consort, was discovered by the architect when demolishing the old buildings, and presented by him to the Council, who have given it a place of honour in their new building in Hallam-street. The old building comprised four stories in Oxford-street and one story in the rear, but, by the application of fourteen light and air agreements, the new building comprises seven stories above pavement level, occupying nearly the whole area of the site.

The new building was originally designed as a constructional steel building, but, when the works were started in 1916, the Ministry of Munitions refused to release the steel and required the building to be re-designed as a ferro-concrete building. The re-designing as a ferro-concrete building was rapidly effected, and the new building proceeded up to third floor level, at which point it was stopped by the Ministry of Munitions under the general building embargo. The work was resumed at the beginning of 1919, the building being now practically completed. The main elevation is carried out in Portland stone, the ferro-concrete construction being partly by Messrs. Summerville, Ltd., and partly by Messrs. G. Munday & Sons.

The building, which consists of large, open floors, is served by a main staircase and passenger lift, and has an external emergency staircase running the full height of the building, discharging at Hanover Square in the rear. It has also a goods lift in the fore court from the street level to the basement. There are no fireplaces, the whole building being warmed by central heating. The main entrance is paved with mosaic, and the walls thereof lined with marble, the staircase dado being tiled. Groups of lavatories are available on each floor. The open forecourt has been preserved, and the shop front runs from basement level up to second floor level, and has been executed in bronze by Messrs. E. Pollard & Co., Ltd. The whole of the front windows are steel case-



FIRST FLOOR PLAN



No. 299, Oxford Street,
MR. DELISSA JOSEPH, F.R.I.B.A., Architect.

ments, supplied by the Luxfer Co. The marble and mosaic work and the tiling were carried out by Messrs. Boulton & Co. The heating system has been installed by the Thames Bank Ironworks Co. The electric passenger lift and the hydraulic goods lift were supplied by Messrs. Waygood-Otis, Ltd., the passenger car being designed by the architect. The external iron staircase, some 90 feet in height, was supplied by Messrs. Hayward Bros. & Co., Ltd. The Portland stone came from the quarries of Messrs. F. J. Barnes, Ltd. The staircase balustrade, designed by the architect, was carried out by Messrs. W. T. Allen & Co. The general contractors were Messrs. George Munday & Sons, their foreman of works being Mr. C. J. Feesey. The architect is Mr. Delissa Joseph, F.R.I.B.A.

THE ELECTRICITY SUPPLY BILL.

THE Electricity Supply Bill has been placed, as it were, in a siding for the present. The Lord Chancellor explained in the House of Lords that it was proposed to cut out all the compulsory powers for the establishment of district electricity boards, all the compulsory powers for the acquisition of main generating stations or main transmission lines, and all the financial clauses except clause 10 (which provides for emergency power stations). The Bill will thus only provide for the establishment of Electricity Commissioners, who will exercise the present powers of the Board of Trade under the Electric Lighting Acts, and with powers to conduct experiments and to set up an advisory committee. In a previous issue, we suggested the advisability of proceeding more slowly, as the Government, with a view to forwarding re-construction, was putting too many undertakings into the melting pot at the same time. The Commissioners will no doubt advise on the whole position, but the Lord Chancellor said it was the intention of the Government to introduce a fresh Bill early next Session. It is to be hoped that time will be given to the Commissioners to get well into the saddle, and that no hurried measure will again be introduced. Much harm has already been done to the industries by the introduction of the present Bill with its compulsory powers, and if undertakings are continually threatened, capital will not be put into them and they will be allowed to stagnate. The continued threat of legislation will in any case have a prejudicial influence, and we could have wished that some assurance could have been given to the existing undertakings that a period of time should expire before the new legislation would be introduced.

The country has suffered from excess of zeal. Nearly every undertaking has been the subject of legislation, and no Parliament of ordinary human beings is capable of grasping and dealing with so many diverse objects at the same time. Ill-thought-out measures, half of which have to be jettisoned, have been the order of the day; no industry has been secure, and thus the revival of trade, instead of being assisted, has been seriously handicapped.

The Society of Architects.

The Parliamentary Secretary of the Ministry of Health, Major the Right Hon. Viscount Astor, and Lady Astor, M.P., will be the chief guests of the Society of Architects at a luncheon to be held at the Trocadero Restaurant, Piccadilly Circus, W., at 12.30 p.m. for 1 o'clock, on January 8, 1920. The chair will be occupied by the President, Mr. E. J. Sadgrove, who will be supported by representatives of kindred Societies, Government departments and other public bodies. The gathering will afford an opportunity of bringing to the notice of the representatives of the Ministry the views of the Society on the housing question, and of the position of architects in relation thereto. Application for tickets for the luncheon, price 12s. 6d. each (not including wines), should be made to the Secretary before January 3.

HOUSING AND TOWN-PLANNING NOTES.

Dwellings for Fishermen.

LAST week the foundation stone of the housing scheme which Sir Philip Sassoon, M.P. for Hythe, has inaugurated for the benefit of the fishing community at Folkestone was laid. Two acres of land were bought at a cost of about £700 an acre, and it is hoped that some of the houses will be ready for occupation by the end of February. The houses are to be built of brick cavity walling, coated with waterproofed roughcast. The roofs are boarded, felted, and covered with local tiles. The ground floor is of concrete and the upper floor of wood. There is a hot-water system for the bath and sink, the water being heated by either the copper or the living-room fire at will, and provision is made for gas cooking. The accommodation includes living room, kitchen and scullery, three bed-rooms, and bath-room. Of the houses now being erected 16 are self-contained cottages and eight are flats, which have two bed rooms instead of three. The total cost is £13,805, which includes £1,755 for foundations rendered necessary by the abnormal site, which varies 32 ft. in level. The excavations necessitated by the slope have been utilised for large store rooms. The price per house is about £625, exclusive of fees.

New Methods and Materials.

The following new materials and methods of construction have been approved by the Standardisation and Construction Committee of the Ministry of Health :—

T. Elsom Hardy, Paddington, W.—A system of reinforced concrete, in which the stanchions are constructed with an inner and outer post, connected with webs, so as to provide for circulation of air within the wall cavity round the building to take up the difference of temperature, the bays between the stanchions being filled in with concrete blocks in the customary manner.

T. V. Haigh, Coodmayes.—The block for the outer part of the cavity wall has a special impervious outer surface, which overlaps the face of the block on one side and at the bottom. These overlaps fit into corresponding rebates in the adjoining blocks, thus forming a continuous overlapping joint throughout the wall, both vertically and horizontally, forming a damp-resisting joint.

W. Wilson, Dunfermline.—Pre-cast slabs made up in units to any required design. The floors are constructed with pre-cast rebated beams and pre-cast slabs. The window and door frames are also constructed in pre-cast concrete.

Concrete, Ltd., Stourton, Leeds.—Hollow concrete blocks reinforced with steel rods in each angle, so that the whole can be lifted as a beam and fixed in position, the floors being constructed with a series of hollow beams.

W. J. Ayles, Stockbridge, Hants.—Concrete blocks with frogs on the inner faces to economise material. Approval is subject to the blocks being made of ballast and not of clinker concrete.

Bonding Block Construction Co., Buckingham-street, W.C. 2.—A block having a return at one end continued through the cavity to the face of the wall, both internally and externally, thus forming a proper bond through the wall at each course, and dispensing with wall ties. The blocks are laid to break joint in each course, and provide a continuous air cavity throughout the wall.

Winget, Ltd., Westminster, S.W. 1.—A system of concrete floors formed of hollow blocks built up into beams with steel reinforcement on the under sides. After being hoisted into position, the upper surface and the space between the blocks is filled in with *in situ* concrete, forming a series of T beams between the blocks.

W. W. Love, Longford-terrace, Folkestone.—The "Minniel" system of construction is a system of reinforced concrete construction where the house is framed up with stanchions and beams, the upper part of the house having the floor beams, stanchions, and roof principals cast in one piece before erection.

W. Alban Richards & Co., Ltd., St. James-street, S.W. 1.—This system is in general in accordance with the standard specification, but a special form of block is also intended to be used, having lugs on the inner faces of the blocks. These engage together, and form a series of vertical bonding stiffeners throughout the wall, thus dispensing with the ordinary wall ties.

Tilbury.

On December 22, the Ministry of Health gave its approval to the last stage of the house plans in connection with the Tilbury house scheme. This scheme comprises 1,520 houses, and is for the express purpose of housing transport workers employed at Tilbury Docks. The houses include baths, and many modern appliances for sanitation and comfort. The Ministry's consent is given subject to the houses on tender coming within the estimated amount. With the already-sanctioned soil sewerage, flood prevention works and roads construction, the total estimated cost of the scheme is 1¼ million pounds. It is expected the contracts will be undertaken early in the new year. A large triangular central park and civic centre are provided, and the sections of main traffic thoroughfares are to be of reinforced concrete.

Shingle for Concrete.

The Skegness Housing Committee has approved of a suggestion that the Board of Trade be approached with a view to sanctioning the use by the Urban District Council of shingle from the beach for use as aggregate in the manufacture of concrete blocks, in connection with the housing schemes.

New Methods of Construction.

The Scottish Board of Health announces that it is prepared to consider applications from parties concerned for approval to special methods of construction of houses. Methods of construction so submitted will be scrutinised by the Board's technical experts, and, if approved, they will probably be brought to the notice of local authorities and others engaged on housing schemes. Applications should be addressed to the Secretary, Scottish Board of Health, 125, George-street, Edinburgh, and should be accompanied by full particulars of the proposed method of construction, the accommodation to be provided, the approximate price per house and estimated life of the house.

Sites for Housing Schemes.

The arrangements made by the Scottish Board of Health, in virtue of which the good offices of the Lands Valuation Department are available for valuing sites in case of dispute, have resulted in a reduction of 38 per cent. on the prices asked by owners of land—the adjusted price in these cases averaging £141 per acre. The total saving up to the end of October was nearly £30,000, but this figure applies only to cases in which the owners asked a definite price. The Department negotiated a number of other purchases in which no price was stipulated.

Hounslow.

The Heston and Isleworth Urban District Council has received the sanction of the Ministry of Health to the laying out of two estates in Hounslow and Isleworth. It is intended to erect 1,320 houses of various types, and a start will shortly be made with the first 30.

Bristol.

A converted 60 ft. by 15 ft. Army hut, containing living-room, three bedrooms, scullery, bath-room, coal store and larder, is on exhibition at Queen's-square, Bristol. The cost of the hut, converted and complete, is £400, but the Disposal Department of the Ministry of Munitions, which is exhibiting the hut, does not undertake to carry out the work of conversion.

WEEKLY HOUSING RETURN.

The return issued weekly by the Ministry of Health states that new schemes submitted to the Ministry during the week ended December 20 numbered 138. The total number of schemes submitted is now 7,748, comprising about 57,250 acres. The schemes approved now number 3,165, comprising about 29,550 acres. Fifty-eight lay-out schemes were submitted and 60 approved during the week, making the total submitted 1,909 and the number approved 1,265. House plans representing 3,511 houses were submitted, and plans for 3,377 houses approved. The total number of houses represented in the plans submitted is 78,818, and in the plans approved 63,362. Tenders for 20,513 houses have been submitted and approval given to tenders for 16,940.

Details of local authorities' schemes dealt with during the week are as follows :—

BUILDING SITES.

Schemes Submitted.—The number received from 58 local authorities was 136, comprising 571 acres, and bringing the total to 7,658, covering approximately 54,850 acres.

URBAN.	ACRES.
Bradford (4 sites)	178.14
West Bromwich (2)	56.30
Risca (2)	48.79
Darwen (4)	17.15
Handsworth	14.00
Caerphilly	12.25

Barnard Castle, 5.94; Birmingham, 1.45; Braintree (1); Frinton-on-Sea, 9; Lowestoft (1); Masham, 1.5; Methley, 7.12; Newcastle-on-Tyne, 2.97; Newmarket, 5; Nottingham, 1.97; Southampton, .21; Sowerby, 3.62; Sutton (2), 4.

RURAL.	ACRES.
Oldbury	40.25
West Dean (3 sites)	33.10
Grimsby	16.00
Chesterton (1)	10.68
Aberystwyth (11)	10.31

Abingdon, 1; Amersham, 1.03; Amersham (1); Blaby, 4.25; Blyth and Cuckney, 1.25; Blything (7), 7.25; Dartford, 1.5; Eastbourne (4), 6.55; Eton (3), 5.82; Godstone, 2.5; Gretton (2), 4; Haltwhistle, 4.5; Headington, .67; Hemel Hempstead, 2; Huntingdon, 1; Loddon and Clavering (1); Maldon (2), 4.61; Melford, 1; Mutford & Lothingland (9), 4.75; Norman Cross, 2.07; Northleach, 3; St. Faiths (2), 1.34; St. Germans, 1.5; Skipton, 1.96; Spalding (2), 3.81; Stow-on-the-Wold, .5; Taunton, 2.3; Tendring, 2.5; Thedwastre (1); Uwchaled (8), 6.33; Wantage (2), 1.66; Wellington, .75; Witney, 1.5.

COUNTY COUNCILS.—Southampton (8 sites), 5.33; Yorkshire (East Riding) (11), 3.36.

Schemes Approved.—The number of schemes approved was 153, bringing the total to 3,136, comprising about 28,900 acres. The schemes newly approved are as follows :—

URBAN.	ACRES.
Bradford (2 sites)	145.91
Frodingham	124.01
Rawtenstall (7)	61.08
Hayes	54.25
Irlam	28.37
Sedgley	17.00
Leominster	13.77
Abersychan	11.92
Worcester	12.60
Bowden	10.75
Hetton	10.50
Rickmansworth (2)	10.43

Battle, 7.94; Beccles, .86; Buglawton, .5; Hipperholme, 2.07; Hornsea, 1.05; Lydd, .65; Rowley Regis, 6.57; Sutton Coldfield, 4; Tottingham (2), 4.4; Wonlock (2), 6.5; West Ham, 6.22; Woodbridge, 2.

RURAL.	ACRES.
Hemsworth	23.07
Lanchester	17.36
Chester-le-Street	17.20
Romford (2 sites)	16.56
East Ashford (6)	11.16

Auckland, 3.35; Berkhampstead, 2; Beverley, 6.75; Biggleswade (2 sites), 3. 71; Bland-

ford, 1.25; Ilofield, 1; Bradfield, .5; Chapel-en-le-Frith, 2; Chelmsford, 2.5; Chesterton, 0.72; Chorley, 6.55; Dartford, 3; Daventry, 5.06; Depwade, 2; Docking, 2; Downham, 7.21; Dunmow, 1.5; Egham, 2.41; Ely (2), 2.5; Epping, 3.5; Faringdon (2), 1.93; Foleshill, .92; Forehoe, 1.46; Freebridge Lynn, 3; Headington, 8; Henley, 1; Hungerford (2), 7.45; Huntingdon, 2.5; Keynsham, 8.35; Lexden and Winstree (2), 6.69; Lichfield, 3.75; Llandaff and Dinas Powis, 1.23; Loddon and Clavering, .75; Luton, 1.33; Malpas (3), 1.33; Market Harborough, 1.07; Melford (2), 2; Morpeth, .25; Newcastle-under-Lyme (2), 6.25; Newhaven, 1; Newport (Salop) (3), 3.78; Newport Pagnell (2), 7.5; Newton Abbott (2), 4.35; Northallerton, 3.75; Norton, 2; Plomesgate (2), 7.76; Preston, 5; Rugby, 4.68; St. Ives, 1; South Stoneham, 2.84; South Westmoreland (2), 1.5; Stafford, 1; Staines, 3.13; Stoke-on-Trent, 2.38; Stone, 1.9; Stow-on-the-Wold, 1; Stratford-on-Avon, 8.38; Thirsk, 1; Ticehurst (2), 3.5; Tutbury (2), 1.46; Walsall (3), 7.5; Walsingham, 3.35; Wantage (2), 3.33; West Dean, 3.78; West Lancashire, 4.02; Wincanton (6), 3.37; Witney, .68; Wokingham, 1.5; Woodstock (4), 8.12; Wycombe, 5.

COUNTY COUNCILS.—Hertford, .34; Huntingdon, .75.

Lay-Outs.

Schemes Submitted.—Fifty-eight schemes were submitted by 42 local authorities, bringing the total to 1,864. The new schemes are as follows:—

URBAN.—Abersychan, Alton, Beddington and Wallington, Bentley-with-Arksey, Blackpool, Clayton, Cleethorpes, Dronfield, Guildford, Guisborough, Jarrow, Kidsgrove, Merton and Morden, Newcastle-on-Tyne, Petersfield, Rawtenstall (2 sites), Rochester, St. Pancras, Tanfield, Waltham Holy Cross.

RURAL.—Amersham, Bedford, Bradfield, Brailes (2 sites), Daventry (6), Docking, Dorchester, Forehoe (2), Hertford, Lanchester, Neath (2), Newbury, Northampton, St. Germans, Shepton Mallett (4), Skipton, Spalding, Staines, Thrapston, Wallingford (2), Wellingborough, Witney (4).

Schemes Approved.—The following 58 schemes, promoted by 43 local authorities, were approved, bringing the total to 1,235:—

URBAN.—Barry, East Ham, Folkestone, Golcar, Heywood, Kidsgrove, Lincoln, Otley (2 sites), Salisbury, Tonbridge, Tottenham, Weston-super-Mare, Woking.

RURAL.—Abingdon (4), Amersham, Berkhampstead, Bradfield (2), Brailes (2), Chapel-en-le-Frith, Crowmarsh, Dunmow, Ely, Gloucester, Godstone, Guildford (3), Hambledon, Hatfield, Headington, Huntingdon, Malling, Market Harborough, Ongar, St. Albans (3), Shepton Mallett, Skipton, Southwell (2), Tendring, Wantage, Wincanton (3), Wing (2), Witney, Woodstock, Wycombe (2).

House Plans.

Schemes Submitted.—Schemes representing upwards of 3,500 houses were submitted by 45 local authorities. The total number of schemes submitted represent 75,976 houses:—

URBAN.—City of London, 48 houses; Abertillery (part scheme), 516; Ardwick-le-Street, 60; Alton (1 scheme); Bangor, 18; Beddington and Wallington, 16; Blackpool, 164; Blyth (part), 10; Briton Ferry, 138; Briton Ferry (part), 98; Crewe (part), 66; Golcar, 16; Islington, 107; Jarrow, 148; Lincoln, 200; Market Drayton, 80; Newcastle-on-Tyne, 41; Newton-in-Makerfield, 112; Northampton, 60; Prudhoe (part), 90; Seghill, 40; Swindon (part), 350; Wellingborough, 32.

RURAL.—Bradfield, 12 houses; Brailes (2), 4; Chapel-en-le-Frith (part), 160; Docking, 6; Dronfield, 40; Forehoe (2), 14; Godstone (2), Headington, 16; Hertford, 8; Luton (3), 28; Neath (3), 224; Neath (part), 378; Newbury, 6; Ongar, 17; St. Germans, 10; Skipton, 32; Spalding, 4; Thrapston, 26; Wallingford, 10; Wellingborough, 18; Wing (2), 8; Witney, 6; Wrexham (part), 58.

COUNTY COUNCIL.—Huntingdon, 4.

Schemes Approved.—Schemes representing some 3,365 houses were approved. The total approved represent 61,785 houses. The schemes newly approved are as follows:—

URBAN.—Abertillery, 546 houses; Abertillery (part scheme), 40; Bedwellty (2), 44; Blackpool, 164; Briton Ferry, 26; Briton Ferry (part), 98; Carshalton, 196; East Ham, 12; Golcar, 16; Luton, 84; Market Drayton, 80; Morley, 18; Newton-in-Makerfield, 112; Northampton, 40; St. Austell (1); Swindon (part), 350; Swinton and Pendlebury, 64; Tonbridge, 54; Wellingborough, 32; Worsley (2), 60.

RURAL.—Abingdon (5), 46 houses; Bedford, 12; Berkhampstead, 8; Bradfield (2), 14; Brailes (2), 4; Chapel-en-le-Frith (part scheme), 160; Crowmarsh, 4; Dunmow, 6; Ely, 4; Godstone (6), 54; Guildford (3), 44; Hambledon, 7; Hatfield, 8; Huntingdon, 6; Luton, 22; Malling, 20; Market Harborough, 6; Neath (4), 369; Neath (part), 278; Ongar, 17; St. Albans (3), 26; Shepton Mallett, 16; Skipton, 32; Southwell (2), 26; Tendring, 6; Thame, 4; Wantage (2), 18; Wincanton (2), 8; Wincanton (1); Wing (2), 8; Witney, 8; Woodstock, 4; Wrexham (part), 58; Wycombe (2), 26.

FIG. 1.

Concrete Cottages (see next page).

THE RAILWAY COMPANIES' CIRCULAR.

A CIRCULAR which has been unanimously approved by the Council of the Railway Companies' Association has recently been issued to the shareholders, and will be read with considerable interest. The railway companies have been the best-managed undertakings of their kind in any country, and their sound finance and the publicity given to their transactions has, during the past seventy or so years, made them a favourite investment with trustees and other investors. It is a well-known fact that they represent the capital to a very large extent of the small investor, and that many persons with small fixed incomes look to the railway companies for all that stands between them and absolute penury.

No charge of profiteering can be brought against the railway shareholders. Their undertakings have during the war been used by the Government without restriction and have suffered considerable depreciation, but the dividends received have been based entirely on a pre-war and by no means especially prosperous period, and, as the Circular points out, the White Paper issued by the Government shows that the advantage of the arrangement has been on the side of the Government. The introduction of the "Ways and Communications Bill," with the powers it contained for the compulsory acquisition of the railways, shook the faith of the shareholders in these well-tried and trusted investments, and the depreciation in railway stock is without precedent.

The withdrawal of the drastic provisions of that Bill and the substitution of "The Ministry of Transport Act" has improved the situation, and the Circular announces that it is believed that the efforts made by the Railway Association for the protection of railway property have been of the utmost value to the railway proprietors and the general community, and that the properties are safeguarded by sections inserted in the Act. There may be difficulty when these undertakings are taken over again from Government control. We hardly think the State has been as successful in managing large concerns and labour as private owners, and the directors will have a difficult time before them. As regards the compulsory acquisition of such undertakings, there is one point often overlooked by the Labour Party to which we may take this opportunity of referring. They look at the actual dividends declared on the nominal amount of stock; but during the past thirty or forty years no stock has been acquired before the railways suffered depreciation at anything like par, and the holders either acquired it on the market or it was issued by the companies at considerable premiums, which made the present holders receive a return on only a four per cent. basis or even less. The stocks are far below par at the present time, but any acquisition even on a par basis would mean to most holders an expropriation of at lehst fifty per cent. of their capital.

The acquisition of the railway undertakings on the present value of railway stock would be an act of spoliation, as that value is solely the result of the war upon these undertakings, which have contributed to so large a degree in bringing the war to a successful end.

The threat of compulsory acquirement has for the time being been removed, and it is to be hoped that the railways, like other undertakings of a public nature, will now be allowed to recover their former prosperity, but the proposed legislation in regard to railways, electrical undertakings, &c., although in part abandoned, has done much to hinder their natural recovery, and in the interests of the country it is to be hoped that Bills which have to be drastically amended and entirely altered will in future not be introduced and kept hanging over the heads of industry like the sword of Damocles to the detriment of their security and prosperity.

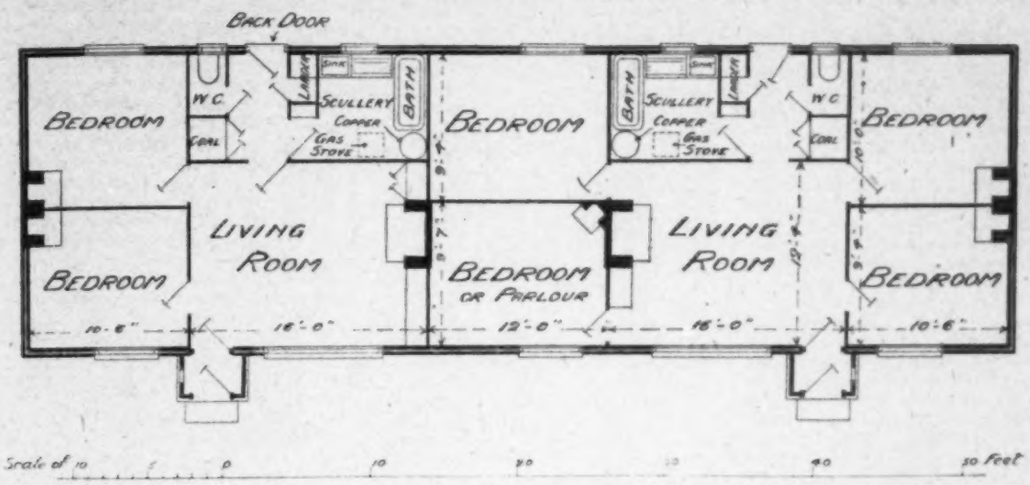


FIG. 2.

CONCRETE COTTAGES.

The object of erecting these cottages was to provide homes for the worker in a very congested area, in as short a time as possible. Figs. 1 and 2 illustrate a pair of cottages, one house having 2 bed-rooms, each room with a superficial area of 100 ft. super; dining room 200 ft. super, containing a cupboard, dresser and cooking range with hot-water boiler; scullery, containing sink with draining-board, bath, copper and gas stove, cold water laid on to sink, bath and copper, hot water to sink and bath. The adjoining house has two additional rooms, one of which could be used as a parlour and one as a bed-room, making a three bed-room parlour cottage. Figs. 3 and 4 illustrate a block of four cottages, the middle two cottages being similar to the first house described above, and the two cottages having three bed-rooms instead of two.

The cottages were constructed mainly of "King" concrete blocks, 2½in. "King" concrete blocks being used on the inside, a cavity of 2 in. and 2 in. concrete blocks on the external face; the walls were bonded with galvanized iron ties; the internal partitions are 2 in. "King" concrete blocks. Fire places were constructed in brick work, and also the foundations of the external walls up to floor level. The cottages were ceiled at plate level, and the roof constructed of light timbers covered with slates.

The cost of these houses erected at Barrow as given by Mr. J. J. Taylor, Surveyor to the Ministry of Munitions, are as follows:—For a two bed-room cottage, as illustrated, £258 14s. per cottage; for the three bed-room cottage, £307 8s. 4d.; and the four bed-room cottage, £353 9s. 4d. This cost includes electric light, fire grates and gas copper complete, ready for occupation. The external works, comprising roads, paths, sewers, drains and fences, cost an average of £56 14s. per cottage, whilst gas and water mains cost an average of £6 5s. 2d. per cottage. These prices are based upon the contracts entered into in October, 1917. An additional £65 per cottage was incurred owing to increases in wages and materials.

Two hundred-and-two of these cottages were erected at Barrow-in-Furness, and thirty-six of a similar plan at Scunthorpe, Lincolnshire.

The "King" concrete blocks, of which these houses were built, were manufactured and supplied by Messrs. J. A. King & Co., 181, Queen Victoria-street, E.C.4. The hot-water system is on an improved type of the low-pressure system, introduced by Messrs. Cornes & Haighton, of 240, High Holborn, W.C.

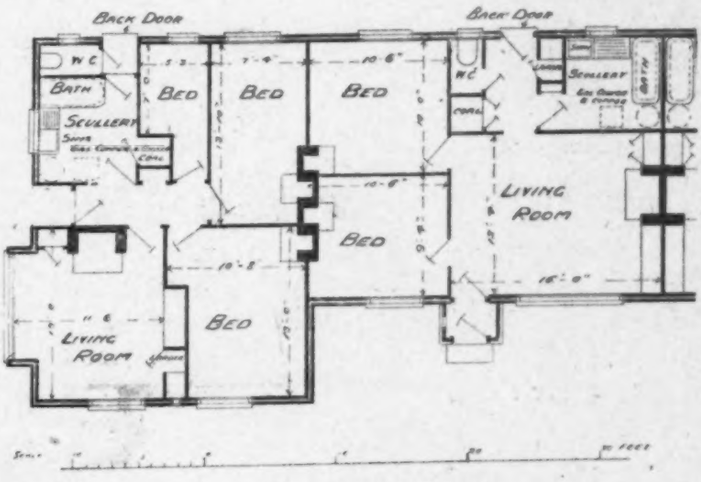


FIG. 4.

FIG. 3.

THE LABOUR-SAVING HOUSE.

We illustrate the plans of the design placed first in the competition organised by the *Daily Mail*, with the object of obtaining plans for a house, which, although it might cost more to build in the first instance, would be more economical to run than the average house, and whereby the increased initial outlay would be returned by a saving in the day-to-day expenses of running a home. The assessors were: Mr. R. W. James, M.I.M.E., A.M.I.C.E., Chairman; Mrs. G. S. Guy, Miss Clementina Black, and Mr. Courtenay M. Crickmer, F.R.I.B.A., who awarded the premiums as follows:—First premium (£250), Mr. C. J. Kay, Lic.R.I.B.A., Bank Chambers, Horsham; second premium (£100), Mr. Berkeley Wills, A.R.I.B.A., 7, Stone-buildings, W.C.; third premium (£50), Mr. E. W. Armstrong, the Architectural Association, 35, Bedford-sq., W.C.

In judging, the assessors set a 100 per cent. standard, and each plan was carefully viewed in comparison with the ideal. The winner of the first premium scored 88 per cent. Four general points were the basis on which the assessors formed their final decisions. (1) Convenience of the plan itself from the labour-saving point of view; (2) The merit of individual labour-saving suggestions incorporated in the house; (3) The economy with which the idea was carried out; (4) The architectural appearance of the exterior.

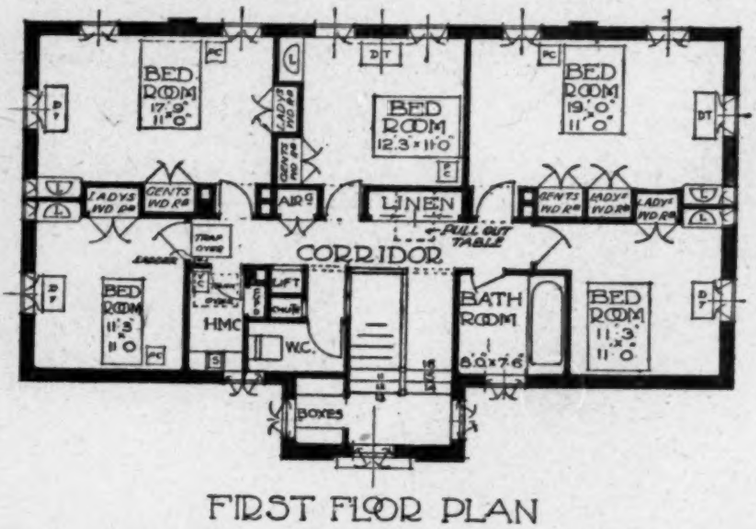
The first two items were very heavily weighted as against the second two, it being contended, first of all, that capital outlay which reduces cost of upkeep is true economy, and that it is a relatively easy matter to design an elevation of a house.

In the design placed first, the assessors state that all angles are rounded, and mouldings practically eliminated. Surfaces can easily be cleaned without damage to the decoration. Bright metal fittings are done away with, and heating, cooking, and washing appliances are enamelled. The floors are damp-proof. The windows are hung and built in steel frames in such a way that both sides may be cleaned from the inside. In the kitchen the appliances are so grouped that a minimum of labour is required. The trades delivery hatch is provided with self-locking compartments to receive packages. The kitchen equipment is fixed on brackets or ball-bearing castors. An electric range, also on castors, has adjustable legs so that it may be made higher or lower. The larder is fitted with removable glass shelves and a built-in food safe, which is water-jacketed. Through this the whole of the cold water supply to the house circulates. In the store, which is fitted to take dry goods and preserved food, the shelves are adjustable and made of enamelled steel. The only coal used in the house is for one anthracite furnace, which heats the whole house and provides hot water. Radiators are in recesses in all the rooms, but are hung on hinges in such a way that they may be swung out from the walls.

In the second premiated design, the difficulty of cleaning behind the bath is obviated by projecting the bath into the centre of the room, the canopy and waste end being built into an angle. The walls of the room are circular for about three feet up, and are tile-lined with a mosaic or tile floor; above, the walls are of white glazed brick. The stairs have no corners or angles, and the balustrade is to be of solid concrete with a hard wood handrail at the top. A combined hot plate service hatch, china cupboard hatch, and sideboard is an innovation in Mr. Wills's plan. Glass, crockery, and silver in general use are kept in the cupboard adjacent to the hot plate, and extra glass, etc., in the adjoining cupboard, both being accessible from the kitchen and from the dining-room. This obviates the necessity of carrying food from the kitchen to the dining-room, or vice versa. Special attention has been given to the relative positions of the cooking range, sinks, plate rack, kitchen cabinet and servery, and also to the small annexe to the larder which is accessible from the kitchen, and which may be used for the unexpended portion of the day's food.

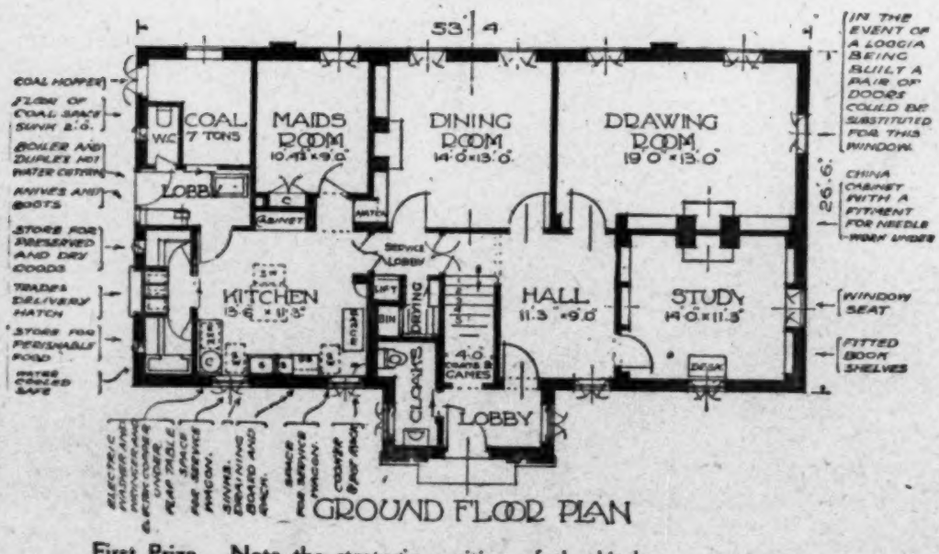
In the third premiated design, the chief object of the author was to provide a house which could be managed by one person. Every room was considered, first separately, then in conjunction with the other rooms. All the rooms are large and airy, and the bedrooms and living-rooms get the maximum amount of sunshine. The kitchen and offices have been arranged to coincide with the sequence of the daily routine of kitchen work.

Note built-in wardrobes and cupboards which mean that only one surface needs cleaning instead of three or even four



FIRST FLOOR PLAN

First Prize. See how the windows, by opening inwards instead of outwards can be cleaned inside and out without ladders.

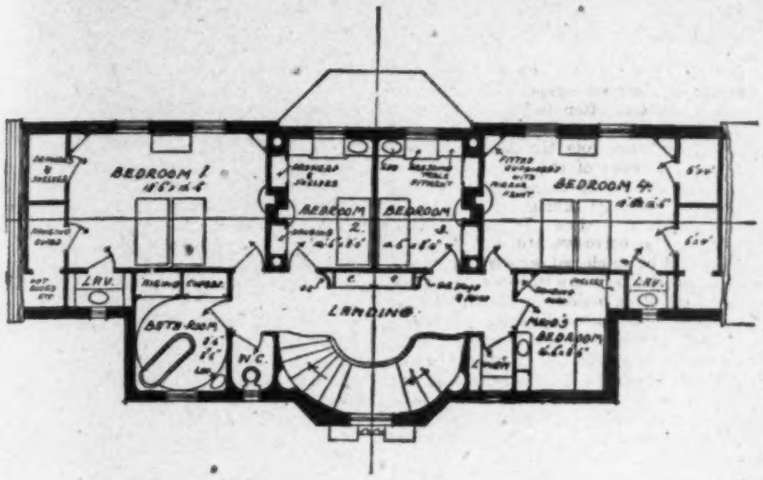


GROUND FLOOR PLAN

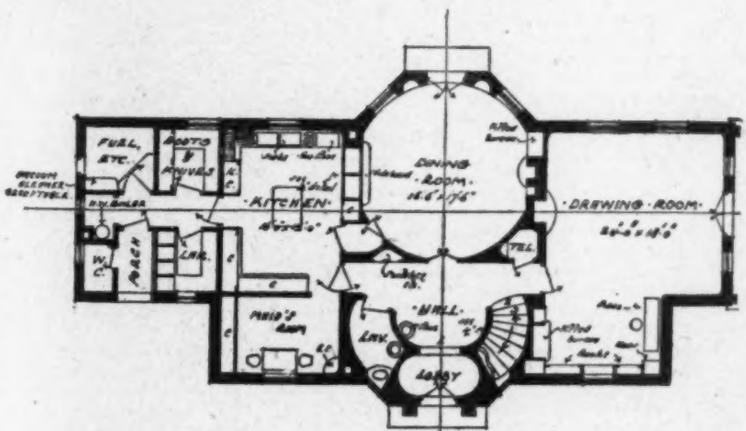
First Prize. Note the strategic position of the kitchen

By permission of the *Daily Mail*.

Labour-Saving House Competition. First Premiated Design, by Mr. C. J. Kay, L.R.I.B.A.



·FIRST·FLOOR·PLAN·



·GROUND·FLOOR·PLAN·

Second Prize. The novel shape of the dining room, it will be seen, does not involve wasted space.

LAW REPORT.

Repairing Covenant.

OFFICIAL REFEREE'S COURT.

Kensington Palace Mansions *v.* Nunn.

This was a claim for damages for breach of a covenant to repair, amounting to £160.

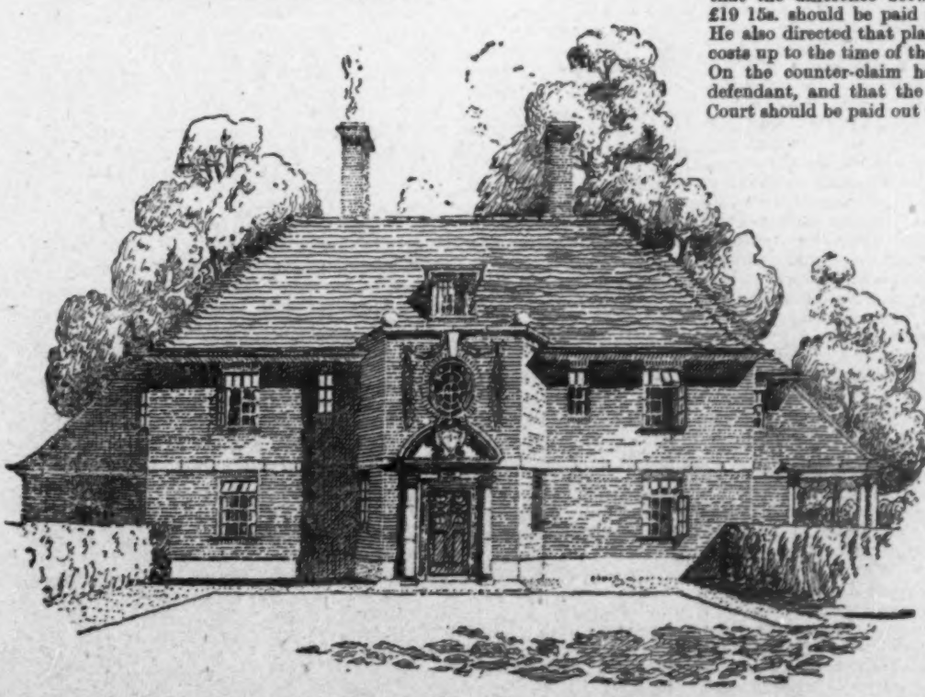
Counsel for the plaintiffs said that although the claim by the pleadings was for £160, some of the items had been agreed between the parties by which the amount was reduced to £150. Mr. Nunn entered into possession in June, 1896, when the property was owned by a lady named Barlow.

The defence was that £40 was sufficient to cover the necessary repairs, and the defendant made a counter-claim which counsel said was somewhat peculiar and unique. He stated that it was a term of the agreement that he should be kept supplied with hot water at all times for the bathroom and lavatory and for general purposes, and that the plaintiffs had neglected to maintain such a supply. For the alleged neglect he claimed damages, but he had furnished no particulars. The plaintiffs had paid £2 into Court in respect of the counter-claim, with a denial of liability. In March, 1918, the defendant had given up possession, and at that date he was served with a notice of dilapidation. Messrs. Chesterton surveyed the premises, and made an estimate of repairs necessary to the amount of £136 8s. The schedule which, however, was not made out in detail, was sent to the defendant, but the amount had grown since to the sum stated in the writ, which included a claim for rent during the period occupied by the repairs.

Mr. G. E. Knight, surveyor, gave evidence in support of plaintiffs' claim, as did also several other witnesses.

The evidence for the defence included that of Mr. G. F. Vigor, who was agent for Mrs. Barlow, the landlady at the date when defendant took possession in 1896. He stated that some of the fixtures claimed for were provided by the defendant on the understanding that he might take them away when he left. Defendant's term was for a period of three years, but he remained over twenty years.

Mr. Verey delivered a reserved judgment, in which he found that the plaintiff was entitled in respect of the claim, to recover £19 15s., and the defendant having paid into Court, on February 11, the sum of £40, he ordered judgment to be entered for the defendant on the claim, and that the difference between the £40 and the £19 15s. should be paid out to the defendant. He also directed that plaintiffs should pay the costs up to the time of the payment into Court. On the counter-claim he also found for the defendant, and that the sum of £2 paid into Court should be paid out to the defendant



Second Prize. The Entrance Front.

By permission of the *Daily Mail*.

Second Premiated Design in the "Labour-Saving House" Competition.—By Mr. G. BERKELEY WILLS, A.R.I.B.A.

WIRING SYSTEMS AND WIRING DEFECTS.

At almost every conference called to consider housing needs, reference is made to the revolutionary changes likely to be brought about by the promised provision of cheap electricity, and as a large number of workmen's houses will be erected by the local authorities, a considerable number of whom are the owners of electricity works, it is most likely that electricity will be introduced to small houses in the future to an extent not hitherto attempted. Hence it is important that architects should have a knowledge of the ordinary principles of house wiring and, what is perhaps of even greater importance, have their attention directed to some of the methods adopted by certain contractors. Of course, if a firm of repute is employed, good work may be looked for, but in view of the hundreds of thousands of cottages, to say nothing of the larger houses and commercial buildings in contemplation, the chances are that some of the work will fall to people whose reputation has not stood the test of time.

It may be worth while briefly to mention for the benefit of architects and builders some of the more important conditions that must be complied with in carrying out an electrical installation and to indicate a few of the methods adopted by the "jerry" wireman to increase his profit at the expense of the property owner. In the case of public buildings, important blocks of offices, or business premises, the wiring contract usually would be placed through a consultant or architect with a firm of standing whose reputation of itself is a guarantee that the work would be carried out conscientiously and in conformity with recognised standards. It is more with domestic installations that we are concerned here, or those in shops or small factories, where the work is not put out to tender but is given usually to that local contractor whose price is the lowest, the owner or tenant seldom being able to judge as to the quality of the material used or the workmanship employed.

It may not generally be known that the use of close-joint conduit does not comply with the wiring rules of the Institution of Electrical Engineers. This system, however, is still retained for the vast majority of domestic installations and for many others, both for lighting and power, in commercial buildings. It has the advantage of cheapness and ease of erection, but it is not electrically continuous and therefore cannot be earthed. Its use is permitted only for short independent runs and not for complete installations, an isolated length that may become "alive" through leakage offering but small risk of fire or of shock. If conduit be employed it must either be of the screwed variety, of heavy gauge, solid drawn and galvanised for the highest grade work, or welded for the usual run of jobs, or it must be of light gauge with the seam brazed and the slip-on fittings secured to the tube by one of the many gripping devices that have been evolved. In all cases the objects to be aimed at are permanent mechanical protection for the insulated conductors and electrical continuity throughout the whole system, so that the metallic protection can be earthed effectively. Earthing, by the way, should be carried out by stout copper wires attached to several points of the system and taken to a suitable earth plate or, more usually, to a water pipe, to which it should be soldered. Gas pipes must never be used for the purpose, and, indeed, care should be taken that at no point does the conduit make contact with a lead or iron gas pipe. The earthing wire itself may be protected by conduit of small size, and should be held under a screw head that makes good contact with the frame of a distribution fuse board, a main switch, a motor starter or some metal fitting or apparatus forming part of the system, earthing screws often being provided by the manufacturers for the purpose.

There is, of course, no necessity to use steel conduit at all for the protection of conductors; frequently, in fact, it sets up troubles of its own. Of these, condensation is the worst. Differences in temperature between the atmosphere and the interior of the conduit cause condensation of moisture that cannot escape, with the result that the conductors often lie in water, or at least are kept damp. This reduces their insulation resistance, rots the insulation, and finally allows leakage of the current. Damp, also, attacks the steel, unless it be heavily galvanised, light gauge tubing corroding away entirely in course of time. In many places, where a damp or corrosive atmosphere exists, conduit cannot be employed successfully. Thus, in chemical works, in many factories, in stables, and in cellars, it is useless to attempt to run steel tubing. For such situations no wiring system that involves the use of steel, iron or brass should be adopted. There are others that are more durable and satisfactory, and these also may be employed with equal satisfaction for installations generally. Although more costly than steel conduit and ordinary V.I.R. cables, "cab tyre sheathed" cable is the cheapest and most effective in the end. It consists of an outer covering of tough but flexible rubber compound that surrounds conductors insulated in the ordinary way, the protective covering being worked up into a circular form. Single wires may be so protected or multiple cables. No further protection is needed, the material being run on the surface or embedded direct in cement or plaster. It is proof against damp, the effects of most acids and alkalis, and the attacks of vermin, while its mechanical strength is remarkable. It can be installed quickly and with a minimum of labour, the overall costs of a complete installation comparing with those in which screwed conduit and V.I.R. cables are employed. In ordinary circumstances, no special fittings are needed, but in specially bad situations, such as in chemical works and stables, corrosion of the joints at fittings and switches must be guarded against, the makers supplying porcelain accessories in which the connections are immersed in oil.

An alternative, unsuitable for specially severe conditions, but convenient for domestic wiring and installations in public buildings, is the "Stannos" system, in which single wires or multiple cables are first insulated in the ordinary manner, and finally are protected by a strip of tinned brass wound spirally throughout their length. This makes a neat finish that protects the conductors effectively, while obviating risk of damage through condensation. It can be run on the surface, or taken between floor and ceiling, or within hollow partitions, and is specially adapted for wiring existing premises, since the small diameter of the wires enables them to be installed on the surface without their presence being obvious, the metallic sheath being painted to match the surrounding colour scheme. It is not advisable to embed "Stannos" wiring in cement or plaster, the acids in which may attack the outer covering; nor should it be stretched between floor joists without a support to prevent sagging. Special attachments are needed at ceiling roses, switches and terminal points generally, and care is needed to ensure that the insulation is not damaged when the outer sheathing is cut away where joints are made. This requires some skill and the use of a special tool, but frequently it is badly done, and trouble arises sooner or later. The wires, although not really flexible, can be bent readily, but great care is needed that the metal sheathing does not cut into the insulation on the inside of a sharp bend. Most breakdowns on "Stannos" jobs are due to this, the trouble taking some time to develop. Properly installed, however, the system is very useful and durable, and is not more costly than light screwed tubing and V.I.R. cables. It has the advantage also that the metal sheath serves to make the entire system electrically continuous; thus earthing is simple and effective. With isolated plant, or with installations supplied from a public alternating current supply through a double-wound transformer, the metal sheathing may be used as the return conductor, thus saving the cost of double wiring throughout.

Most of these advantages apply also to the Henley and Prescot systems, in which V.I.R. cables are protected by an outer covering of lead or of lead alloy. There is no condensation trouble, the outer covering serves for earthing or for the return conductor, and the wiring can be run on the surface. It is neat, fairly flexible, can be painted and is very durable, but it should not be buried in plaster and must not be used where any risk exists of the lead being attacked, while it must be supported throughout its length. Other wiring systems include those in which the conductors are enclosed in a tightly wound wire spiral or laid in a flat trough of thin metal with detachable cover. The former is strong mechanically, fairly flexible, free from condensation troubles, but is not neat in appearance; the latter, although approximating to a conduit, does not introduce condensation troubles because the thin gauge of the metal trough responds quickly to changes in the temperature. It has the advantage that the wiring can be inspected at any time and alterations made or additional wires added, while its appearance is not objectionable, the flat trough being painted to harmonise with its surroundings. It can with safety be embedded in plaster or cement, but is pierced readily by a nail or screw, with risk of damage to the wires inside.

There is no cheaper system than the original wood-casing, and it is likely to be employed in the future for domestic and commercial wiring on a larger scale than ever in view of the official veto upon the open-joint thin-gauge conduit. It offers no objection from condensation, permits of ready inspection of the conductors and of extension, is durable, and affords all the mechanical protection needed. It must be run neatly, however, and the edges of the grooves rounded at corners so that the conductors are not injured. Care must be taken to avoid damaging the wires when the cover is fixed, and this should be done with small screws and not with nails, preferably at either side instead of in the centre fillet. The casing and cover should be taken direct into the fixing blocks behind switches and fittings and not merely shaped round them, and it should be used in hollow partitions and beneath floorboards; many wiremen omit it in these positions, the conductors being left loose. Casing and cover should be varnished to minimise risk of moisture affecting the conductors, and it should be painted after erection.

If conduit be embedded in plaster, tubing of oval section should be employed for these runs, since this projects less than the circular tube and saves labour in cutting deep chases. Special adapters are supplied to permit of joints between oval and round conduit. With ordinary slip-joint conduit, electrical continuity can be obtained more or less satisfactorily by the use of small steel wedges driven between the tube and fittings, or more effectively by the use of special grip fittings. These may be screwed and of larger diameter than that needed for the size of tube used, taper screwed bushes being employed to grip the tube, from the ends of which the enamel must be scraped. In another system slots are cut near the outlets of fittings and steel wedges driven in after the tube has been inserted, the wedge cutting through the enamel and establishing contact between tube and fitting. Any of these continuity grip systems are cheaper in first cost than screwed barrel, but none is really satisfactory as a substitute.

On the Continent, in many part of America and in the Overseas Dominions, wiring is carried out with ordinary V.I.R. cables stretched over porcelain insulators screwed into walls and ceilings. Carefully installed, the system need not be unsightly and it has the advantage of cheapness, accessibility and ease of erection. Being visible throughout its entire length, the wiring can be kept under constant supervision, and defects can be remedied promptly before they develop seriously. Alterations and extensions can be effected readily and cheaply, while there is no risk of condensation troubles and little likelihood of electrical troubles arising. Flexible wire, stretched over small porcelain insulators, is used also on a large scale for local circuits, this being neat, inexpensive

and readily removed or altered. In this country, such wiring is not permitted by the Board of Trade or recognised by the wiring rules of the Institution or of insurance companies, except under certain conditions for installations in business premises. The need for cheaper systems of wiring is recognised generally, for in their absence the heavy cost of electrical work prevents its wider adoption, particularly in small house property. If electricity is to become the poor man's light, it must be brought within his reach by the lowering of the cost of installation and by the relaxation of many restrictions that serve no useful purpose and merely hold up progress.

It is not suggested that safety or durability should be sacrificed to low initial cost, and there is no reason why, in cases where price is not the determining factor, electrical installations should not be carried out on the most approved system. At the same time, it is possible to wire a house for electric light at a very low figure by the use of a surface system, and for such a system to meet all reasonable requirements. With the systems generally insisted upon, much of the work is hidden and often is scamped.

Many, indeed, are the tricks of the "jerry" wireman to save material, and thus cheapen work to his own benefit. It does not follow that because at the terminals of a main switch, for example, the conductors of a 7–16 cable are visible that this size of cable is run throughout. Sometimes only a few feet are used, and a smaller and cheaper cable joined on where it cannot be seen. On a long circuit the saving in cost is considerable. This trick can be discovered only by opening up the conduit or casing after erection and examining the cables some distance away. It frequently happens that a lower class of cable is installed instead of the C.M.A. grade that may have been specified, and it is not sufficient to ask for the labels that accompany the coils. Some contractors keep these labels from other jobs for production when needed. An insulation test will not necessarily show up the substitution, but if a short piece be cut and submitted to the makers the latter will place matters beyond doubt. A favourite dodge of the "jerry" workman to save himself trouble is to cut away some of the conductors of a multiple cable if there be any difficulty in accommodating them in terminal pillars or sweating sockets. Since a chain is as strong as its weakest link, a cable so cut is of little more use than one of smaller size, and it is liable to heat when carrying its rated load. Terminals should be examined closely in order to discover this trick, and also to ascertain whether the binding screws are driven fully home, a common practice being to neglect this important detail. The loose contact resulting from screws at terminals being only partly entered, causes heating and may result in fire through an arc being set up. With the elimination of the cheap and worthless electrical accessories of German make that flooded the British market in pre-war days, a general improvement in the standard of electrical work may be looked for. There are plenty of "competition" accessories, as they are called, still in existence, however, and a careful eye should be kept upon them, for they are fruitful causes of trouble. In cheap ceiling roses, lampholders and fuses, for example, the metal is often skimped to a dangerous degree, and will heat up if the load carried be anything like heavy. The terminal posts are often held to the metal base by a riveted joint that gives up at a touch, while the binding screws sometimes are of insufficient length and diameter to secure the circuit wires. The thickness of metal is such that only one or two threads can be tapped in it, with the result that the screws overturn upon quite reasonable pressure. So badly are switches, lampholders and adapters sometimes made that they refuse to make contact at all, while they corrode rapidly in a damp atmosphere, the metal being of too light a gauge and protected by a very thin coating of poor lacquer. Open-type fuse boards should never be allowed. In these the fuse wires are laid in grooves in the detachable porcelain carriers, and no protection is afforded from contact between the hand and live metal, while if the fuse should be inserted on a short-circuit it would blow in the hand, causing a painful burn. If prime cost must be studied closely, and none of the excellent designs of fuse-boards in which all live metal is shielded are available the fuse-carriers at least must be of the tubular or enclosed pattern, so that they can be inserted with safety. All fuse boards should be examined to ensure that the circuits they control are divided evenly among the "ways." It will often be found that a single double-pole way has to carry a load that ought to be distributed over two or three. In other cases it will be found that the two sides of a given circuit are not connected to the same pair of "ways." This is a common fault, and one that leads to trouble subsequently.

Another point that should be watched is the correct polarity of the switches. A careful wireman will stick to one colour for the positive, or "live," wire and to another for the negative or return lead throughout an installation, red usually being chosen for the former and black for the latter. If this be done, it is easy to trace the circuits and to see that they are connected up properly. All local single-pole switches should be connected to the "live," or positive, wire. In some installations no care is taken to ensure continuity, some switches being on the "live" and others on the "return" wire. If a leakage occurs to earth between a switch connected to the return wire and the lamp it should control, the opening of the switch may not extinguish the light, since the circuit may be completed independently of the switch. If the "live" wire be looped into every switch, such a happening would be impossible, and the wiring between the switch and the lamps in its circuit would always be dead while the switch was opened.

No joints in the wires should be permitted anywhere. They are often made to save material, but they are potential sources of trouble, every joint being a weak spot in the system. If joints are allowed, they must be soldered carefully and not merely twisted, and after soldering the joint must be washed over with scalding water to remove any traces of corrosive flux. There is no need, however, to use an acid flux, for several excellent pastes and fluids are available that have no action on the wires. Joints must be carefully insulated by a layer of pure rubber and one of adhesive tape, and they must never be concealed within conduit or casing. A good wireman will avoid the necessity for joints, all the circuits being carried out on the looping-in system. In this method, the "live" wire is looped into every switch throughout the installation and the "return" wire into every fitting or ceiling-rose. This involves doubling the length of many individual wires, but the greater safety and simplicity secured justify fully the additional cost of material, the labour costs being somewhat less, since no time is lost in making joints. Attention must be given to the method of connecting flexible wires to ceiling roses, adapters, wall-plugs and other fittings. Connection should so be made that no strain comes upon the strands of the flexible cord, *i.e.*, the entire cord must be gripped so that any pull is taken by the insulated covering, and not by the fine wires alone. Plugs to fit wall-sockets feeding portable devices ought to be of the "Handshield" pattern, in which the flex passes to the terminals through the side, and is not subjected, therefore, to any strain when the plug is pulled out. The handle on the plug makes it convenient to use, while the shoulder shields the hand from risk of shock or fire in the event of the plug entering and setting up a short circuit. Most troubles with flexible wires occur at the point where they enter a fitting, the twisting and bending causing the wires eventually to break and often to touch one another, thus blowing the local fuse and even causing fire. If suitable accessories are used, this trouble may be minimised, but careful wiring up in the first instance will help materially to lengthen the life of the flexible cord. It is foolish to employ flexible cord of cheap quality, and it is more expensive in the end.

It is to be hoped that no more cheap and nasty German cable and flexible wire will ever be used in this country. There must be thousands of miles of shoddy wire in private houses, offices and workshops. The wire itself is fair enough, but the insulation is defective. When first put in, a good insulation test often can be obtained, the megger reading perhaps to infinity. If the same job were tested a year after, probably it would be found that the insulation resistance had dropped to a dangerous figure. It is said that the Germans used synthetic rubber for insulating cables and wires, and this deteriorates rapidly. Its use enabled the makers to sell what appeared to be an excellent article at a price less than half that charged for what seemed the British-made equivalent. In many cases, where cheap German cable has been installed, the whole of the wiring has had to be taken out in a year or so and replaced at heavier cost by British material, short-circuits, mysterious leakages and fires having arisen without any cause other than that due to defective insulation.

In order to cheapen the initial cost, some electrical contractors divide up an installation into too few circuits. This saves wire and trouble at the time, but is poor economy. Thus, if through a defective lamp a fuse should blow, half the house may be plunged into darkness, and few householders can replace even a blown fuse. Every floor should have its own distributing fuse-board, with two, three, four, or more separate "ways," according to the number of lamps controlled. If one circuit becomes useless for the moment, through a fuse blowing, the remaining circuits will be unimpaired. With thoughtful wiring, the circuits can be so arranged that no single fuse blowing will place even one room in darkness. With a separate fuse-board on each floor, not only are the lamps distributed over several independent circuits, but every floor is independent also, while additional circuits can easily be arranged for. The main cable may be looped in the different fuse-boards from floor to floor, but it is better to run a separate pair of cables from the main switch to each board, every floor, therefore, being fed independently, the cables themselves being protected by double-pole main fuses close to the meter and main switch. The latter, by the way, should not be of the usual coupled tumbler type, which gives trouble sooner or later. A well-made double-pole ironclad switch costs but little more, and is a sound and durable accessory. It may be combined with a pair of main fuses or cut-outs, or these may be separate. Local switches, which in this country usually are of the "tumbler" variety, and nowadays are of the flat form, which is so much neater than the old fluted pattern, should be fixed so that the "dolly-heads," as the knobs are called, must be pushed in a downward direction to light up the lamps they control. Some wiremen fix them upside down.

Except when wiring the cheapest class of property, fullest advantage should be taken of the possibilities of modern switch control. Although two-way switches have been on the market for many years they are not used to the extent their convenience justifies. They permit of a lamp, or group of lamps, being controlled independently from two places, however remote. Applications that suggest themselves are at the head and foot of stairways, at opposite ends of passages, in rooms with two doors, and so forth. "Intermediate" combined with "two-way" switches permit of one or more lamps being controlled independently from any desired number of points. Thus, in an hotel, the lamps in a long corridor may be switched on and off quite independently from any or all of the doors opening on to it. With the applications of these and other modern switch controls every architect and builder should make himself familiar. They increase enormously the comfort of an installation, and tend to effect economy in current consumption, by avoiding needless use of light. The selection of suitable lamps calls, also, for

attention. In no case should those with carbon filaments be employed; they use from three to four times the energy needed for the light given. Lamps with filaments of drawn tungsten wire always should be used, and only those of standard make should be permitted. There is ample choice among British-made lamps, a cheap lamp being the most expensive in the end, for it has a short life, and may absorb an undue amount of power. There is such a range of candle powers available that there is no excuse for any area being lighted inadequately, or in excess. Lamps of quite small candle-power, and, therefore, consuming a proportionately small amount of current, may be used for bathrooms, landings, and so forth, the higher candle-powers being reserved for the living rooms. Reflectors of prismatic glassware increase the useful light of any lamp enormously, and should be used in place of silk shades, fancy globes and the like, which absorb light instead of reflecting it.

In conclusion, the following hints may be useful as tending to minimise trouble and ensuring a satisfactory installation. Don't overload fuses, *i.e.*, do not attach a radiator or griller to a lighting circuit provided with a five ampere fuse only, especially on a low voltage supply. If heavily loaded apparatus is added run separate wires to feed it, and see that these are properly protected by fuses on both poles. Most installations were put in to supply lights only, and will not stand the addition of kettles, radiators or cookers, although flat-irons, small table-type grills, suction cleaners, or coffee percolators usually may be connected to the existing wiring. The current they use, however, will be charged for at lighting rates, whereas users are entitled to a supply for such purposes at the heating rate, which is about a quarter, or even less. It pays, therefore, to run separate circuits with a separate meter, unless the small heating or cooking devices are to be used for short periods.

All wall-sockets should be controlled by a switch alongside; it is not sufficient to rely upon a switch on the portable apparatus, for the length of flexible wire feeding it will then be "alive" all the time, unless the plug be withdrawn. There are several forms of interlocked switch and plug that may be used with advantage, any of which prevent the plug being withdrawn unless the switch has been opened.

The threads of lampholders fitted with screwed rings to hold shades or reflectors should be rubbed with a vaselined rag when first fixed. This will ensure the ring running along the threads easily and avoid the trouble so often met with through a ring binding and preventing the removal of the shade. If the holder itself is rubbed over in a similar manner, it will be less liable to tarnish, or in damp situations to corrode. Holders fitted out-of-doors always should be galvanised to avoid corrosion and premature breakdown. Rubber rings between the lamp and holder terminals prevent the entry of moisture and prolong life. Lamps in shops and offices that can be reached by the public should be locked in their holders to prevent unauthorised removal, several devices for this purpose being available. Wooden blocks used for fixing switches and fittings to walls or roses to the ceiling should be attached independently of the accessory, *i.e.*, the fixing screws for the switch or rose should only be used to secure it to the block and should not serve also to hold the block. Blocks for ceiling roses can be secured firmly to the laths by the use of specially thin and long screws made for the purpose, but they must be driven carefully, a small hole preferably being made first with a twist drill. Switch blocks attached to lath and plaster walls can be treated in a similar way, and if fixed properly will never work loose. Blocks fixed to brick walls should not be held by nails or by screws in tapered wedges driven into the brickwork. Blocks so held are certain to work loose and come away in course of time. A good plan with thin walls is to remove a small area of plaster and to place over the brickwork a piece of $\frac{3}{4}$ in. floorboard somewhat smaller than the block that will cover it. This piece of wood can be attached with a number of ordinary floor-brads driven direct into the brickwork.

With a thicker wall "limpet" or similar plugs should be used, these plugs when driven home in a hole made with a "jumper" opening out at the back and forming thus a back taper that will never come out. An alternative is the "Rawlplug," this being a small tube of specially prepared fibre which is placed in a hole driven in brick, plaster, marble or cement by a diamond-pointed jumper. A fixing screw driven into the centre of such a plug opens out the hole and forces the fibre against the sides. These plugs are only about $\frac{1}{4}$ in. in diameter and can scarcely be seen, when in position, while they give a grip that no weight or strain in reason will loosen. They are cheap, can be fixed quickly and are suitable for attaching saddles to conduit or to surface-wiring, for fixing blocks to walls and ceilings and, apart from electrical uses, for fixing picture rails, and supports for heavy weights. All switches to control lamps should be fixed close to the doorway on the side remote from the hinges, at a height not exceeding 4 ft. 6 in. from the floor. If a group of switches is used, the centre of the block should be at the height mentioned. Many wiremen do not trouble to bring out their switch wires close to the door, as this in some cases involves trouble owing to the presence of studs within the wall space, but this should never be permitted, a switch some distance from the door being difficult to locate in the dark. Wall sockets are best situated on or sunk flush with the skirting, with the controlling switch about 4 ft. 6 in. immediately above on the wall. Fuse boards must be placed where they can be got at readily for fuse replacement. Pendants should be hung at a minimum height of 7 ft., preferably higher.

Flexible wire, trailing over the carpet, is a nuisance and a fruitful source of trouble through mechanical injury. If its presence cannot be avoided, only the best grade should be used and where possible armoured flex should be employed, such at C.T.S., as this will withstand any amount of rough usage. If portable cooking devices such as toasters, grills, percolators, and the like, are needed regularly on the table, it is a good plan to fit a sunk socket with spring lid in the floor below the table, the carpet being cut and folded back in case it may need replacement subsequently. If more than one device is required at a time, a multiple socket with detachable plugs can be fitted underneath the table itself. This would be fed from the floor socket and in turn would supply any number of devices up to four or more simultaneously. Needless to say, the cable feeding the socket must be of sufficient size safely to carry the maximum current required. With this arrangement no flexible cord is visible. By withdrawing the plug, the table can be moved and the carpet swept in the usual manner with the suction cleaner, the socket being flush with the surface. By attention to details such as these indicated, an electrical installation should prove of maximum convenience and utility, and should last for years without the need for repairs or renewals.

Woburn Sands War Memorial.

MR. W. B. STONEBRIDGE, Architect.

[We illustrate above a memorial clock tower, by Mr. W. B. Stonebridge, which has been designed for a Bedfordshire village. The base is of rough Cornish granite setts; and the façades of the tower either in rough grey terra-cotta or Weldon stone, with Hopton wood panels, with the names of the fallen in leaded lettering. There will be clock faces on two sides; the other sides being filled with carved panels showing naval and military flags, surmounted by a crown. The dome is to be of copper, surmounted by a weather vane. The cost of the obelisk is estimated at about £650].

THE GATTIE TRANSPORT SYSTEM.

The Departmental Committee which was appointed to investigate Mr. A. W. Gattie's proposals for improving the method of handling goods and traffic, and to consider the practicability of introducing any of the suggested improvements into the existing transport system, outlined their objections to a central clearing house for London in their report issued recently. Their objections are —

(*a*) The huge capital expenditure required; (*b*) The displacement of a large population; (*c*) The impracticability of the traffic involved being conveyed over the railway lines connecting the trunk systems and the clearing house; (*d*) The concentration of the whole of the goods traffic at one spot; (*e*) The necessity of maintaining most of the existing depots; (*f*) The complete upheaval of all the practices and customs of the carrying on of public trade which would result from the establishment of the proposed clearing house; (*g*) The fact that this method of dealing with goods for sorting would increase the amount of handling.

The Committee considered that if the Gattie scheme were adopted it must be applied to every town in the country, and machinery for handling the containers would have to be provided at every goods station remaining in operation. Mr. Gattie suggested that at pre-war figures it might cost 300 million pounds. At present day costs the outlay would be very much greater, and the Committee cannot recommend such an expenditure of public money.

The Committee was of the opinion that a concentration over so large an area as that proposed for the Metropolis would be physically impossible and economically wasteful. The centralisation of the whole traffic now carried on by the 74 goods stations in one concentrated clearing house at Clerkenwell or elsewhere in the centre of London would produce so much congestion at the centre and everywhere near the centre as would make such concentration impossible in practice. The estimate of £26,000,000 for the whole of the clearing house and its machinery and rail and road connection appeared to the Committee far too low.

THE BUILDING TRADE.

BUILDING MATERIALS AND METHODS.

By ALAN E. MUNBY.

THE writer is very pleased to have this opportunity of bringing to wider public notice the interesting report on the above subject, compiled by the Munitions Invention Department of the Ministry of Munitions. This Committee was set up in July, 1918, to inquire into the utilisation of products, native or manufactured, available for building purposes in this country. The work of this body came to an end with the Armistice, but what has been done merits attention; and, as the continuation of these researches is most desirable, they are worth dealing with in some detail.

Use of Gypsum for Constructional Work.

Attention is drawn to the large gypsum deposits in this country and to the small output and use of this material, the mining of which is inexpensive, while the conversion into plaster of Paris by merely roasting at about 200 deg. F. is a simple matter. It is pointed out that plaster slabs have a much greater vogue in France than here, and that, strengthened with reeds from Norfolk or Holland, they readily stand transport. The Committee carried out some tests on the weight-carrying capacity of these slabs. Made of common plaster, these were found to have a crushing strength of about ¾ ton per sq. inch. Reeds weaken the slabs and render them unfit for load-carrying; but breeze and plaster slabs will carry heavy crushing loads. In spite of this statement, however, a very interesting experiment is cited—and that of a most practical kind—showing what reed-reinforced plaster partitions can do. Such a partition, 3 in. thick and 12 ft. by 8 ft. high, against a wall at one end and a return partition the other, and containing a door without a solid frame, was made to carry joist ends of a floor, 12 ft. by 12 ft. over, which were loaded to give 36 cwts. per foot super. on the top surface of the partition. No effect was noted, and it was only after very violent treatment by ramming the partition, that it eventually collapsed. The slabs were newly laid and unplastered. The tendency of iron and steel to decay in such slabs is discussed. Opinions on this matter seem to differ, but it would appear—and one would expect this on chemical grounds—that, in the absence of damp conditions no decay takes place. The plaster is a neutral and stable compound; it does not attack the metal, but, on the other hand, its protective action is merely mechanical, hence the recommendation that where iron or steel reinforcements are used, 4 per cent. of lime should be added to those plasters, is, probably, a wise one, as this should guard against corrosion in moist conditions.

It is satisfactory to see flooring plasters dealt with. These are very largely used in Germany and other countries; and, at the present price of Portland cement, merit careful attention. When gypsum is slightly heated, it loses three quarters of its water of crystallisation and forms plaster of Paris; but when very highly heated, the whole of the water is expelled, and if the heating is not too long continued the material when ground to plaster sets very slowly, forming an exceedingly hard and durable substance. The use of such plaster in old cottage floors is referred to, where even the primitive methods of its preparation have led to lasting results; and there would seem to be no reason why such flooring should not often replace Portland cement or boarding with great financial advantage.

The Committee recommends that for upper floors wood beams should be fixed with common white plaster slabs on them or on fillets, to bring them flush with the beam tops between them and then those overlaid by one inch of flooring plaster after the joints of the slabs have been pointed. The slabs should be reinforced with light galvanized iron wire. If fillets were used, this should make a very stiff floor and admit of some reduction of the timber joists as compared with the use of ordinary boarding. That ordinary plaster slabs have some strength as load carriers is proved by the Committee's tests. Two bending tests under a distributed load may be cited, in which the span was 4 ft. 3 in., the slab being 4 ft. 6 in. long and 1 ft. wide, supported on knife edges. Such a slab, 2½ in. thick, broke with a load of 630 lbs., while one 3 in. thick sustained a load of 1,267 lbs. without fracture. Reeds were used in these slabs, but appeared to reduce rather than increase the strength. The second part of this report deals with lime bricks, made of fat lime and sand, ground clinker, or other like aggregate. These bricks have been known for many years, and it is pointed out that before the war the production in Germany amounted to 1,555,000,000 annually. They consist of 10 per cent. of good fat lime, and 90 per cent of inert silicious aggregate such as sand or ground clinker, at least 15 per cent. of which must pass a 100-mesh sieve. Not less than this percentage must be finely ground with the lime either dry or with water, and the whole material then mixed, submitted to a 100 ton pressure per brick, and steamed at 120 lbs. pressure for eight to ten hours. The Committee states that combination occurs chemically between the lime and the silica. This is probably true; but, as far as the writer is aware, it has never been definitely proved. Granulated blast furnace slag forms a very cheap aggregate, and if this granulation is effected by water, most of the objectionable sulphur is removed by the decomposition of sulphides of lime. If the granulation is otherwise effected we are told that care must be taken in its selection. This is a case in point for the continuation of the Committee's work. Care in selection will not meet the case because no one knows at present what amount of sulphur is really permissible, nor do the works which produce slag guarantee the composition of this waste material which will vary from time to time with the ores smelted and the fuel used. Anyone who has been near a smelting works knows what mountains of material—one of the chief curses of the iron-worker—exist in the form of slag, and it is high time that an unbiassed series of tests was undertaken to determine the limitations of what should be a remarkably cheap and useful aggregate. No doubt brick-making works could be established adjoining ironworks, which would reduce the cost of carriage to that of the transport of the bricks themselves, and at present this aggregate can be had for less than nothing. Further, having regard to the pozzuolanic nature of certain slags, these bricks could probably be made with some modifications in the direction of economy in the plant necessary for bricks composed of lime and sand. Investigations, as far as these were carried, seemed to show that bricks of this character are very durable, and if the materials are carefully mixed and ground, less porous than ordinary facing bricks. Specimens examined included some 14 years old. Statistics given upon a large number of American and German sand-lime bricks, show an average crushing strength of 3,740 lbs. per square inch, a rupture modulus (in the same units) of 505, and an absorption for water of 13½ per cent. For cottage building the Committee recommends two brick on edge walls united by the usual iron ties and the use of cement or good hydraulic lime for mortar, of which not much is required, as the hold is apparently not so good as with clay bricks. Some valuable data and diagramatic illustrations of plant necessary for manufacture are given, from which it would appear that a 30,000 brick-per-diem plant would cost about £18,000, and larger plants slightly less in proportion. A thousand bricks are estimated to require 3 tons of sand, 5 cwt. of lime, and 2½ cwt. of coal; and, as far as production is concerned, to represent the labour of one man for a day in a plant of reasonable magnitude. The attention of capitalists might be directed to this matter, which at the present price of bricks should be a very lucrative investment, assuming manufacture to be embarked upon in suitable localities.

Part III consists of a Memorandum by Mr. H. A. Humphrey, on building substitutes, and contains in three pages a great deal of suggestive matter. After reciting the desirable properties for slabs and the restrictions in connection with cheap production, the writer deals with the possibilities of reeds, peat, heather, seaweed and timber waste. Of these, peat appears to him very promising, and, mixed with clay and heated to 510 deg. C., slabs can be formed capable of taking nails, and may be coated with cement or tar to render them weatherproof. It is suggested that such waste substances as sawdust, and even straw and grasses, might be heated to a temperature sufficient to involve partial decomposition, and then pressed into slabs. Mineral waste, such as slate, might be moulded with Portland cement into roofing sheets, while cell pitch, the waste product of cellulose factories, which contains 78 per cent. of organic matter, has great adhesive power, and could be used as a resinous binder. Here is a valuable field for exploitation which should yield some fruitful results.

Part IV deals with various matters very interesting, among which are experiments on waterproof millboard, composed of waste cellulose, treated chemically, and submitted to heat and pressure, which in the form of sheets can be corrugated, and appears from tests so far made to weather excellently. This seems to present an opening for much extended use to replace joinery of certain kinds which involves special labour, and can be standardised. Many years ago the writer used ordinary millboard in single sheets for surfacing hospital doors, and his experience was that this must first be seasoned. The material eventually employed is still standing excellently. At the time he approached the supplying firm on the subject of making hospital papier mâché sashes in moulds, but was unsuccessful in getting the matter taken up. This new material seems to present a possibility of re-opening the subject and extending it, especially at the present price of timber and labour.

A short account of hollow brick Katona walling, as used by the Union Building Co., of Berlin, is followed by some account of blast furnace slag as cement, and as aggregate, preliminary American experiments show that under compression tests 1 : 2 : 4 slag concrete is 17 per cent. stronger than pebble concrete, 16½ per cent. lighter in weight, and of greater tensile strength and elasticity. The bond strength is 15 per cent., and the transverse strength some 40 per cent. higher, while such slag concrete better resists impact. After a year no appreciable corrosion of embedded steel was observed. This material has already been referred to in this lengthy review, and the country may surely look forward to some speedy authoritative statement as to the all-important sulphur question from our Industrial Research Department. Selenitic limes are touched upon, but merely as a means of increasing the rate of setting. These limes merit much more attention, for though used considerably for plaster, there is no valid reason against their use for mortar. Many poor limes can be greatly strengthened by the addition of 5 per cent. of gypsum, and should then often enable local limes to replace expensive Portland cement. Patent floors of sawdust and magnesium chloride receive a brief comment, and it was found that sawdust particles, coated with plaster of Paris, will adhere to Portland cement. It is quite time the

chemists told the trade how to procure magnesium oxychloride free from the deliquescent chloride itself which is the chief evil in these patent floors. The report closes with a short account of the Calway concrete construction method, and attached are a number of appendices, including a good bibliography on chemical literature of plaster of Paris, and a list of patents since 1901 on inventions upon the utilisation of waste products for building purposes.

Principal A. P. Laurie and his Committee are to be congratulated upon such an excellent record for only seven months' work, and it is for architects and all others interested in building matters to see that these efforts brought to so untimely an end are not thrown away.

STAMPING INSURANCE CARDS.

We may draw the attention of our readers to the case Gladstone *v.* Burton. The respondent in that case, the employer, contended that he had committed no offence under the National Insurance Act and the Regulations made thereunder, as he always stamped the insurance card at the end of the period for which it was current. The Divisional Court (Mr. Justice A. T. Lawrence doubting) held that the contributions must be paid before the wages were paid in respect of the period for which contributions are payable, and the case was remitted to the justices with a direction to convict. Under the National Insurance Consolidated Regulations, Article 10, sub par (i), it is provided that the contributions shall be paid before the wages are paid, but the respondent relied on the proviso to this sub-par: "Provided nevertheless that it shall be the duty of the employer in every case, (a) before the termination of the employment; (b) within six days after the expiration of the currency of the card; (c) within 48 hours after receiving a request from the employed contributor, to affix to the card the stamps." According to the finding in this case, this proviso does not apply to overrule the preceding provision that the contributions must be paid before the wages, but applies where for one of the causes stated, the card may require stamping at an intermediate period.

RAILWAY RATES.

An increase in railway rates, to come into force on January 15, and to apply to the whole of the United Kingdom, was announced on Monday. The increases on existing charges vary from 100 to 25 per cent. The charges for coal, coke and patent fuel are increased by 25 per cent., plus a flat rate of 3d. per ton, irrespective of distance; other merchandise in Class A is increased by 30 per cent. plus 3d. per ton, subject to a minimum addition of 6d. per ton and a maximum of 2s. The charges for Class B goods are increased by 40 per cent., and a flat rate of 3d. per ton, with a minimum addition of 6d. per ton and a maximum of 3s. per ton; class C goods by 50 per cent. plus 6d. per ton; and classes 1 to 5 by 60 per cent. plus 1s. per ton. The charges for returned empties, and goods conveyed by passenger train or similar service, are increased by 50 per cent. The cost of building will be affected to some extent by the increased rates. The carriage of bricks, cement, concrete, and tiles will be increased by 40 per cent., plus a flat rate addition of 3d. a ton. For timber, if charged by actual machine weight, the increase is 50 per cent., with a flat rate addition of 6d. per ton; if carried by measurement weight, it is 60 per cent., with a flat rate addition of 1s. per ton. The cost of the carriage of road-making materials will also be considerably increased.

Health Week.

The Right Hon. the Lord Mayor of London has consented to act as Chairman of the General Committee promoting Health Week, to be held from May 2 to May 8, 1920.

ARTIFICIAL LIGHTING AS A FACTOR OF INDUSTRIAL EFFICIENCY.

Ninety-nine people out of a hundred, if asked what was the best kind of natural light for sustained work, would express a preference for the diffused daylight received through a roof having a skylight facing north. Hence the popularity of the north light or the saw-tooth roof in modern factory construction. In buildings where this is not possible, the designers usually make a point of providing windows which reach right up to the ceiling, in order to take the utmost advantage of all downward light. Whatever the means adopted, the aim is always to secure an even, well-diffused illumination, without, if possible, any direct sunlight.

The answer to the question as to what is the best kind of daylight, carries with it an implicit condemnation of artificial lighting as generally arranged in factories and workshops. Instead of simulating good daylight the artificial lighting is frequently its very antithesis, and is usually characterised by unevenness, inconvenient shadows, exposed lamps which cause glare and dazzle, and often by sheer insufficiency. In view of this, it is not surprising that factory production at night or in the late afternoon tends to slacken in speed and to fall off in quality, while the operatives complain of eye strain and headaches, and the accident hazard is visibly increased. These facts are well known to factory managers and industrial economists, and that is why night shifts are looked upon with disfavour.

It is impossible, when the figures relating to production and accident rate are considered, to avoid the inference that the wasteful reduction in the one case and the tragic increase in the other, under artificial light, are simply due to its relative inadequacy or poor quality; and it is a fair assumption that, if the illumination could be equalised throughout the whole working period, the discrepancies mentioned would completely disappear.

Good artificial lighting must first of all be adequate, and adequacy means more than just enough light to see by. The illumination must be sufficient to permit of the same easy and comfortable vision that is experienced under good daylight. The lighting must also be comparatively uniform over the whole working area, and although a complete absence of shadows is not desirable, what shadows there are should be vague and undefined. Finally, there must be no glare. Glare is simply the effect of excess of brightness in the field of vision. The most pronounced example of glare is the dazzling effect of direct sunlight. Exposure of the eyes to the direct rays of the summer sun is not only uncomfortable but, if prolonged for more than a few seconds, may cause injury to the optic nerves. In a smaller degree the same effects are produced by exposed artificial light sources. These are very much less brilliant than the sun, but, on the other hand, they constitute a more insidious danger than the latter, because the visual results are not so immediate or apparent, and people will work under glaring artificial light for many hours, whereas they neither would nor could work for more than a few seconds with sunlight in their eyes.

With modern electric lighting appliances there is no difficulty in arranging the illumination of any factory in such a manner as to comply with the requirements indicated. In regard to sufficiency of light, for example, the latest type of half-watt electric lamp is available in a variety of sizes from a 100 to 3,000 candle-power, with one or other of which it is possible to secure any desired degree of illumination. As these lamps operate nearly twice as efficiently as the ordinary metal filament lamp, their use will enable a considerable increase in illumination to be obtained for the same current consumption. A decision as to what intensity of illumination is necessary in a particular factory can, of course, only be arrived at after an investigation of the conditions involved. As a general rule, the intensity in workshops in which hand work is carried on should not be less than 5 foot-candles. In factories with fairly light walls, and ceilings lighted by means of half-watt type lamps in suitable reflector equipment, this intensity would involve an energy expenditure of about 1 watt per square foot of floor area. On this basis, a workshop of 2,500 square feet would require half watt lamps totalling 2,500 watts, which might, according to height of ceiling and shape of room, be split up into 25 lamps of 100 watts, 8 lamps of 200 watts, or 5 lamps of 500 watts.

The uniformity of the illumination will, of course, depend on the spacing and number of units. Providing that approximate uniformity is secured, it is obviously more economical to use a few large units rather than many small ones. One has to strike a compromise. Uniformity will also be affected by the type of equipment employed. By means of a translucent glass bowl suspended beneath the lamp, the light can be spread over a considerable area, so that the use of such bowls enables the lighting engineer to achieve uniformity with fewer units of higher candle power than would be possible with bare lamps, or with lamps equipped with ordinary reflectors.

Shadows may be reduced by thoroughly diffusing the light, so that instead of coming from a few isolated points it appears to proceed from a relatively large area. The translucent bowl method indicated above will ensure good diffusion, because most of the light is reflected on to the ceiling where it is re-directed downwards into the room. In effect, the ceiling becomes a light source of large area and low intrinsic brilliance, which is a similar condition to that obtained with a north light roof.

Glare will also be eliminated by the same means since the lamp itself will be hidden by the bowl, which, if of the proper density, should glow with the same degree of brightness as the ceiling. However the lamps are equipped the units should be placed well above eye level, and, indeed, from all points of view it is best to fix them quite close to the ceiling in workshops of ordinary height, say up to 30 feet, and in no case should the height be less than 12 or 15 feet. Of course, when bowl fittings are employed they must be fixed a few feet from the ceiling. The foregoing is a very rough and general outline of the best modern practice of electric lighting. There are many variants, but all methods agree as to the main requirements.

Insufficient light and misleading shadows are probably the most dangerous characteristics from the accident point of view. All passages and alley-ways in factories should be illuminated in such a manner that moving machinery, belts, steps and obstructions are clearly and unmistakably defined. A shadow in the wrong place has caused many an industrial fatality. Glare is another danger. Even a moment's glance at a brilliant exposed light may confuse the vision, or, indeed, may even render vision impossible for the time being.

Electric lighting on up-to-date and properly engineered lines provides, moreover, a means, not only of increasing production and reducing accidents, but also of rendering the workers more happy and contented in their work. The economic value of contented workpeople has never been expressed statistically, but that it is by no means negligible is indisputable.

A Coal Economiser.

With the present high price of coal and the difficulty of obtaining supplies, devices which will minimise the amount of coal consumed in the domestic grate should be in great demand. The "National" economiser (manufactured by Messrs. G. A. Harvey & Co. (London), Ltd., of Woolwich-road, S.E.), consists of a grid with vertical bars which can be bent to fit inside any shaped grate. It is claimed that this device gives an ordinary grate all the fuel-saving properties of a slow-combustion stove, with the resultant economy of coal consumption.

"CONVENIENT HOUSING"—1.

HEATING, COOKING AND KITCHEN ARRANGEMENTS.

SOME IDEAS FROM CANADA AND AMERICA.

WHILE in the matter of design we in England possess houses of all kinds most satisfying to the æsthetic mind, it is very doubtful whether we can claim to have produced houses equal to the Canadian and American in comfort and efficient equipment. Especially is this so in the smaller cottage, and the homes of the vast number of people whose incomes range between £250 and, let us say, £750. This is not so much due to a lack of imagination on the part of architects and builders as to the tenacity with which we, as a nation, hate innovations. Rather than sacrifice some prejudice or habit of life, we sacrifice our comfort and waste valuable time. But in this new era, when the nation is setting out on a great campaign of reconstruction, obsolete customs and depressing labours that hamper and blight a better and saner way of living must go by the board. We shall do well, therefore, to gain experience from the wide world; there is no nation so eminently wise that it can afford to ignore the wisdom of its neighbours; on the other hand, it is to be hoped our nation will not be content to copy blindly, without reason or consideration.

It could be shown that many of the trans-Atlantic methods are cheaper in first cost, and most certainly so ultimately. Nor is domestic drudgery necessary; drudges have little time or spirit for pleasure or profit, but their lives are used up as a candle left to gutter in a wind—wasted and unlovely. The duties of a housewife will be a burden or not in proportion to the effort conserved in each process; and they will be irksome or otherwise according to the cleanliness of the operation and the ease with which results may be obtained.

In speaking of Canadian and American conditions, I shall refer chiefly to those found in the Island of Vancouver, and the States of Washington and Oregon, because here the climatic conditions, both as regards temperature and humidity, approximate to our own.

The domestic question of heating the house and cooking for the family is, perhaps, of all questions the one where there is the widest difference between the two lands. There are houses, of course, without central heating which require other methods, but even then the extravagance of building open fires, taking into account the extra cost of brickwork and grates, is only to be found in larger houses. The class of house of which we are treating would probably have one open fire in the parlour; the other rooms would have portable closed stoves, costing about 10s., and burning wood, fixed where and when required. Stove pipes from these are led into a flue 9 in. by 9 in., and often one chimney will serve for two or three rooms. These stoves require little cleaning, and prevent any large amount of dust. When we consider how many flues built in our houses are practically never used, that under these conditions they deteriorate rapidly, and that their construction is one of the highest costs in a house, we may well pause to think. But the usual modern cottage or small house has a basement in which there is a hot-air furnace (incidently used as an incinerator). This heating apparatus is a simple convenience, saving much hard work and adding to the comfort of the home. Around a central fire-box is a chamber fed by two ducts for fresh air drawn from outside the house; this air being heated rises by vertical asbestos-covered metal shafts built in between the studding of partitions. A small grill radiator, about 18 in. by 12 in., having a shutter to close it at will, is set above the skirting board in the rooms. Bedrooms, bath rooms and passages upstairs are thus usually of a moderate temperature (about 58° F.), while the lower rooms receive the hotter air, let us say, between 65° and 70° F.; a most reasonable condition.

As the fuel is stored in the basement near the furnace, there is little trouble in keeping the one fire burning. All the extra work due to dust from fires, or the discomfort of chilly air without them, as in England, is obviated. But merely for the enjoyment of seeing an open fire in the parlour, and sometimes in the dining room where this is, as usually, separate from the kitchen, they may be provided in addition to the radiators. These fireplaces are now usually built in good face brick or tiles, and lend themselves to interesting design by just proportion, bonding and jointing. The recess is lined with fire brick set in fire-clay, and a basket grate or dogs can be used. The tiled hearth will have a C.I. ash trap connected below with the ash dump. The housewife merely requires to brush the ashes over the trap and they fall through; this can be done whenever the fire is made up. In building flues, certain principles are adopted which appear to be the reverse of those employed here—the result is that chimneys emit the smoke at the top and not in the room. When it is considered how much drudgery is connected with the laying and cleaning of English open fires, the carrying away of ashes, the carrying of heavy scuttles, the blackleading of grates, and the maximum waste of fuel in producing the minimum heat; when the cost of these fires is considered, both in construction and use, is it not time to turn to something more practical? The open fire is a homelike luxury to be thought of after all necessities have been fully provided, and then treated in an efficient way.

The kitchen range, unlike the old type of English nightmare, does not require a ponderous brick cave to hide its inefficiency; it stands out clear in the room on four iron legs about ten inches off the ground, resplendent in nickel steel, and proud of its importance. No hearth is needed, but a metal mat sometimes backed by asbestos is often placed beneath it by the cautious. The stove-pipe is carried into a straight brick flue. Coal for the kitchen is stored, as stated, in the basement, and is carried up by a small hand-power lift that lands by the side of the range—usually in the lower part of a small cupboard. No scuttle is needed, as the lift forms a bin for the coal. Hot water for all household purposes is heated by a coil set in the firebox of the range and connected at the back within easy reach, with the necessary supply and return pipes; the tank stands on a pedestal near by, often in a warm-cupboard, and sometimes covered with asbestos packing to prevent loss by radiation and keeps the kitchen cool in summer. Should there be any need to remove the coil or disconnect the tank it can be done without disturbing the use of the fire, and a new coil can be set by any intelligent person.

As a rule, a kitchen is treated as a cooking-place and not a living-room, the housewife is thus free and undisturbed in her duties, while through the open door she keeps an eye on the children. In consequence, it is an advantage to have the kitchen compact and well-equipped so as to involve the minimum movement. The sink will be here, although there may be another on the back porch, or in the pass-pantry in better houses. It is becoming the custom to cover the kitchen walls to a height of about four feet with Keen's cement finished smooth and ruled off to look like tiles, and painted or enamelled white. This gives a bright, clean effect; and when the additional expense of flush panels to cupboard doors, &c., and rounded nosings to all reveals can be found, the result is a kitchen of charming appearance and with the least lodging for dirt.

It should be noted here that in a house as described there would be only four flues; two to open fires in parlour and dining room and two straight flues to furnace and kitchen range. As it is often possible to arrange these in one stack, the amount of brickwork is considerably less than that usual in England in similar houses. Again the space occupied by wide chimney jambs and numbers of flues is considerable in a small house. Where the dining room is only heated by the furnace there is, of course, additional saving of cost and labour without any serious loss of comfort. The dining room, it should be mentioned, is the general sitting room, although the custom of having folding doors, or merely an open arch, between this room and the parlour results in both being fairly well used.

The arrangement of the kitchen is a matter that no two housewives can agree upon, nor would it often be possible to satisfy even one. But if the processes of preparing dinner (the most important and constant of kitchen duties) are arranged as far as possible in their order from left to right, the greatest economy is attained, and a vast amount of cross journeys and muddled movements avoided. If the range is opposite or well to the right of the sink, the store cupboard (as described later) should be to the left of the range and right of the sink; the service door to the right of the range and left of the sink. The larder can be either right or left of the sink, but close to it. If the kitchen is small, a table to the right of the range; if large, it may be in the middle of the room provided it does not impede direct movement. The store cupboard is a matter over which many an architect's fame has been blighted; the demands are high, but the housewife here shows great sagacity. The lower portion to table height contains besides cupboards two or three bins—zinc-lined—and made to tilt forward; one for flour, one for sugar (which is usually bought in large quantities). In the table top and sliding into a recess is a composition or marble pastry board. The upper portion has doors which, when open, reveal every kind of household stores neatly arranged and easy to reach. The housewife stands at this store cupboard, having collected her needs from the larder, makes her preparations without gyrating like an inebriated top, moves but (let us say) three paces to the range, which, if she is lucky, has an elevated oven to save stooping, and awaits results and the dinner-hour. In this class of kitchen there will also be a narrow cupboard, flush with the wall and built between two studs, about twelve inches wide, four inches deep, and about five feet high; in this there is an ironing board hinged at the lower end, and having a leg at the other, which, on pulling down the board falls into position. The larder, not being intended for a siege, or as a collecting place for neglected scraps, consists of a cupboard not often over three feet wide (often far less) and about eighteen inches deep; shelves arranged fairly close together are provided, made of perforated zinc or battens on a wood frame. The usual inlet and outlet at top and bottom permit a current of air to circulate, but it is not usual to have a window.

A compact kitchen reduces the household labours in a way little appreciated until tested, and it would be interesting to calculate the hours saved by Canadian and American women which they are able to apply to pleasure, ease, or profit, while their sisters in England still drudge and groan.

"S."

The Roads Advisory Committee.

The following were last week appointed members of the Roads Advisory Committee:—Mr. F. Dent, County Councils' Association; Sir J. Mackenzie, Association of County Councils in Scotland; Mr. J. A. Brodie, Association of Municipal Corporations; Mr. W. H. Prescott, M.P., Urban District Councils' Association; Mr. P. J. O'Neill, Irish County Councils' General Council; the Hon. Sir A. Stanley, Royal Automobile Club; Sir Joynson Hicks, M.P., Automobile Association and Motor Union; Mr. O. P. Maclagan, Royal Scottish Automobile Club; Mr. E. White, Royal Irish Automobile Club; Mr. F. S. W. Cornwallis, Royal Agricultural Society; and Mr. Will Thorne, M.P.

RATES OF WAGES IN THE BUILDING TRADE.

THE following are the present rates of wages in the Building Trade in the principal towns of England and Wales. It must be understood that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur :—

	Masons.	Bricklayers.	Carpenters, Joiners.	Plasterers.	Slaters.	Plumbers.	Painters	Masons' Labourers.	Bricklayers' Labourers	Plasterers' Labourers.
Aberdare	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/8½	1/8½
Accrington	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†		1/5½–1/6½	
Altrincham	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Ashton-under-Lyne	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Barnsley	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/8½	1/8½
Barrow-in-Furness	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Barry	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/8½	1/8½
Bath	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/4½	1/4½	1/4½
Bedford	1/6½§	1/6½§	1/6½§	1/6½§	1/6½§	1/6½§	1/6½§	1/3½§	1/3½§	1/3½§
Birkenhead	2/–§	2/–§	2/–§	2/–§	2/–§	2/–§	2/–§	1/4½§	1/4½§	1/4½§
Birmingham	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/9½	1/7½	1/7½	1/7½
Bishop Auckland	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Blackburn	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†		1/5½–1/6½	
Blackpool	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†	1/9½†		1/5½–1/6½	
Bolton	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Bournemouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/2½§	1/2½§	1/2½§
Bradford	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Bridgwater	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/2½	1/2½	1/2½
Brighton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/3½	1/3½	1/3½
Bristol	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½§	1/6½§	1/6½§
Burnley	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§		1/5½§–1/6½	
Burton-on-Trent	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Bury	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Cambridge	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/5½§	1/3½§	1/3½§	1/3½§
Cardiff	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Chatham	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½	1/3½	1/3½
Chelmsford	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/1½	1/1½	1/1½
Cheltenham	1/6½	1/6½	1/6½	1/6½	1/6½	1/7½	1/6½	1/4½	1/4½	1/4½
Chester	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§		1/5½§–1/6½	
Chesterfield	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/5½	1/5½	1/5½
Colchester	11	11½	11½	1/–	11	1/–	9½	8½	8½	8½
Coventry	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/6½	1/6½	1/6½
Crewe	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½		1/3½–1/3½§	
Darlington	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Derby	1/8½	1/8½	1/8½	1/8½	1/8½	1/–§	1/7½	1/5½	1/5½	1/5½
Doncaster	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Dudley	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Durham	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
East Glam. and Mon. Valleys	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Exeter	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/4½	1/3½	1/3½	1/3½
Folkestone	1/–§	1/3½	1/3½	1/3½	1/2½	1/3½	1/2½	1/–§	1/–§	1/–§
Gloucester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½§	1/3½§	1/3½§
Grantham	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Grays	1/11½§	1/11½§	1/11½§	1/11½§	1/11½§	2/–§	1/10½§	1/8½	1/8½	1/8½
Grimsby	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Great Yarmouth	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/3½	1/2½	1/2½	1/2½
Guildford	1/6½	1/6½	1/6½	1/6½	1/6½	1/7½	1/5½	1/3½	1/3½	1/3½
Halifax	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Harrogate	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Hartlepools	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Hastings	1/3½	1/3½	1/3½	1/3½	1/3½	1/3½	1/2½	1/–§	1/–§	1/–§
Hereford	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½§	1/3½§	1/3½§
Huddersfield	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Hull	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Ipswich	1/3½§	1/3½§	1/3½§	1/4½	1/4½	1/4½§	1/2½	1/1½	1/1½	1/1½
Lancaster	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§		1/5½§–1/6½	
Leamington Spa	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Leeds	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Leicester	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/6½	1/6½	1/6½
Lincoln	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/5½	1/5½	1/5½
Liverpool	2/–§	2/–§	2/–§	2/–§	2/–§	2/–§	2/–§	1/8½§	1/8½§	1/8½§
Llanelly	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
London	1/11½§	1/11½§	1/11½§	1/11½§	—	2/9½	1/10½§	1/8½	1/8½	1/8½
Loughborough	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½	1/5½	1/5½
Luton	1/6½§	1/6½§	1/6½§	1/6½§	1/6½§	1/6½§	1/5½§	1/3½§	1/3½§	1/3½§
Maidstone	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½	1/3½	1/3½
Manchester	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Mansfield	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½	1/5½	1/5½
Merthyr Tydfil	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Middlesbrough	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Newcastle-on-Tyne	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/11½§	1/9½§	1/5½§	1/5½§	1/5½§
Newport, Mon.	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Northampton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½	1/5½	1/5½
Norwich	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/4½	1/2½	1/2½	1/2½
Nottingham	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/6½	1/6½	1/6½
Oldham	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Oxford	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/4½	1/2½	1/2½	1/2½
Plymouth	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½§	1/5½§	1/5½§
Pontypridd	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Portsmouth	1/4½	1/4½	1/4½	1/4½	1/4½	1/4½	1/3½	1/1½	1/1½	1/1½
Preston	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§		1/5½§–1/6½	
Reading	1/7½	1/7½	1/7½	1/7½§	1/7½	1/7½	1/5½§	1/4½§	1/4½§	1/4½§
Rochdale	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Rochester	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½	1/3½	1/3½
Rugby	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½§
St. Albans	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/3½§	1/3½§	1/3½§
St. Helen's	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Scarborough	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Sheffield	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/1 §	1/7½	1/7½	1/7½
Shrewsbury	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Southampton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/2½§	1/2½§	1/2½§
Southend-on-Sea	1/7½§	1/7½§	1/7½§	1/7½§	1/7½§	1/7½§	1/6½§	1/5½	1/5½	1/5½
Southport	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§		1/5½§–1/6½	
South Shields	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/11½§	1/9½§	1/5½§	1/5½§	1/5½§
Stockport	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Stockton-on-Tees	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Stoke-on-Trent	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/5½	1/5½	1/5½
Stroud	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½§	1/3½§	1/3½§	1/3½§
Sunderland	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/9½§	1/5½§	1/5½§	1/5½§
Swansea	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½
Taunton	1/6½	1/6½	1/6½	1/6½	1/6½	1/6½	1/5½	1/3½§	1/3½§	1/3½§
Torquay	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/5½	1/3½§	1/3½§	1/3½§
Wakefield	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/10½	1/7½	1/7½	1/7½
Walsall	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½	1/5½	1/5½
Warrington	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
West Bromwich	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/8½	1/6½	1/6½	1/6½
Wigan	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½	1/11½		1/7½–1/7½§	
Windsor	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
Wolverhampton	1/8½	1/8½	1/8½	1/8½	1/8½	1/8½	1/7½	1/5½	1/5½	1/5½
Worcester	1/7½	1/7½	1/7½	1/7½	1/7½	1/7½	1/6½	1/4½	1/4½	1/4½
York	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/9½	1/6½	1/6½	1/6½

The Masons' rate given is for bankers: fixers usually 1d. per hour extra. * War bonus of 2s. per week granted. † War bonus of 3s. per week granted. ‡ War bonus of 3s. 6d. per week granted. § War bonus of 5s. per week granted. ¶ War bonus of 7s. 6d. per week granted. ‖ These rates include the 12½ per cent. bonus. [The above rates, unless otherwise shown, are exclusive of 12½ per cent. bonus.—ED.]

WAGES ARBITRATION AWARDS.

Scotland.

DECISIONS were given last week by the Industrial Court, at Westminster, in a large number of arbitrations on wages claims in the building and allied trades, including the following: The Building Trades of Scotland Operatives Wages and Conditions of Service Board (on behalf of the operatives), and the Bute Master Joiners' Association, the Perth and District Master Masons' Association, the Scottish Building Contractors' Association, the Kilmarnock and District Master Masons' Association, the Dundee Master Masons' Association, the Dumfries Master Painters' Association, the Ayr Master Painters' Association, the National Federation of Master Painters in Scotland, the Kirkcaldy and District Master Joiners' Association, the Hawick and District Master Carpenters' and Joiners' Association, the Clyde Navigation Trust, the Ayr Master Builders' Association, the Scottish Reinforced Concrete Contractors' Association, the Master Lathsplitters' Association, the Scottish National Building Trades' Federation, and the Corporations of Glasgow, Edinburgh, Leith, Dundee and Aberdeen, and between the Workers' Union and the Asphalte Trade Association of Scotland. In all cases it was claimed that the rates of 2s. 2d. per hour for tradesmen and 1s. 10d. per hour for labourers be substituted for the existing rates, as from December 1st, 1919, and the decision of the Court was that in full satisfaction of the claims submitted there shall be paid to the workmen concerned an advance of 1½d. an hour over the rates determined by awards Nos. 313 and 314. This advance was granted on the basis of a working week of 44 hours, and is to take effect on such rate as includes or consolidates the 12½ per cent. bonus on earnings where such bonus was previously paid.

In the course of the hearing of the claims, it was represented to the Court that, consequent upon the conversion of the 12½ per cent. bonus into wages, the rates of the workmen concerned were in some cases not expressible as hourly rates in ordinary terms of currency, and required the addition or subtraction of small sums from the weekly earnings. A general desire was expressed that the practice of making such small additions or deductions should cease, and the Court was asked to deal with the matter. The view of the Court was that the hourly rate payable under awards 313 and 314, including the 12½ per cent. bonus, should be computed to the nearest farthing, and that the small adjustments at the end of the week should be discontinued. The rates of wages as established under this decision of the Industrial Court are to be the substituted rates of wages of the workmen concerned for the purpose of the Wages (Temporary Regulation) Act, 1919, as modified by the Industrial Courts Act, 1919. The advances are to take effect as from December 1, 1919, or from the beginning of the first pay period following.

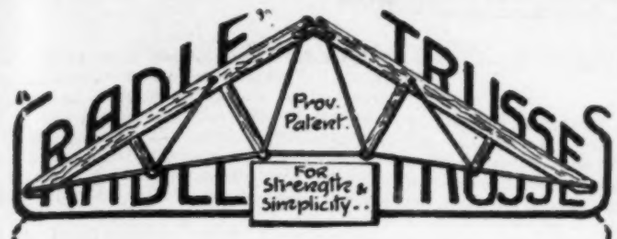
Bicester.

The Industrial Court also heard the case between the National Amalgamated Society of Operative House and Ship Painters and Decorators, and Messrs. Layton & Sons, T. Smith & Son, H. Jackson & Son, F. Blencowe, and L. Penn, of Bicester. The claim was that 1s. 5d. per hour for carpenters, 1s. 4d. per hour for painters and 1s. 2d. per hour for labourers, be substituted for the existing rates. The decision of the Court was that the existing rates be increased by 3d. per hour, making 1s. 3d., 1s. 2d. and 11d. respectively, as from January 1, 1920.

Books Received.

PRIVATE COMPANIES. By H. W. Jordan. London: Jordan & Sons, Ltd. Price 1s. 4d.

REPORTS FOR THE YEAR 1918 ON THE SCIENCE MUSEUM, THE GEOLOGICAL SURVEY, AND THE MUSEUM OF PRACTICAL GEOLOGY." London: H.M. Stationery Office. Price 2d. net.



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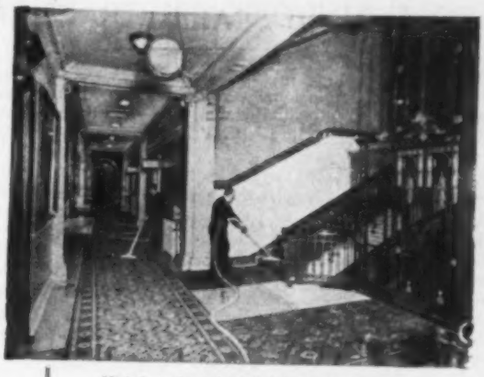

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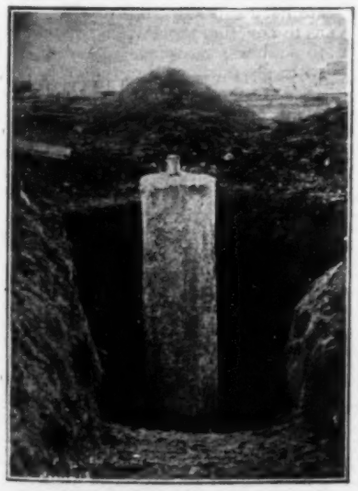

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A MULTI-SCALE TRANSFORMER.

THIS instrument, patented by Mr. John Rymer-Jones, M.Inst.E.E., was designed especially for reducing drawings to the limited dimensions permissible for patent specifications. The ratio, *i.e.*,

$$\frac{\text{The length decided on for the copy}}{\text{The length of the original drawing}} \text{ or } \frac{x}{1}$$

gives the largest drawing permissible, taking the length of the original drawing as 1.

Fig. 1 shows a number of concentric circular segments—alternately fine and dark lines—engraved on a thin and opaque celluloid sheet having near its right-hand limit a radial zero line (*a X Z*) 12.5 inches long and graduated into 100 equal divisions ⅛ in. long. This scale is overlaid by a narrow strip of transparent celluloid—rising about ⅛ in. above it—so that its left edge exactly coincides with the zero line (*a X Z*) from which all measurements are made. This raised zero line is convenient because the draughtsman can feel when the end of the measuring batten—referred to later on—is quite home against it. The relative lengths of the circular segments and of their chords are in proportion to their distances from the centre (*a*) and therefore proportional to the scale values where their respective arcs cut the zero line (*a X Z*), *e.g.*, the chord *W Z* of that part of arc 100 is double the chord *V Z* of the corresponding part of arc 50.

Figs. 4 and 5 show an end view and plan of the measuring batten (*m*), on one edge of which (starting from the extreme end) is ticked off with a soft and finely pointed lead pencil the length on the original drawing which is to be applied to the scale-transformer for reduction; and on the reverse edge (also starting from the extreme end) are to be marked the reduced values, as shown in Fig. 5.

The procedure is as follows:—The extreme limits of any linear measurement to be reduced are first ticked off from the drawing on to the batten (*m*), and this length is then transferred to the reduction board and ticked off (with the fine point of a lead pencil) as a chord on the particular circular segment selected. Which one this should be depends on whether the length of the line is to be increased or decreased, and also on the ratio determined on for the reduction. The further process of the reduction is explained later on.

The employment of the batten (*m*) is very convenient, because the draughtsman can quickly tick off on to it several sub-divisions, that happen to be in a straight line, at one operation (see Fig. 5) and then plot them, one after the other, as chords to the particular circular segment selected for the reduction, and thus save much time and exertion by considerably reducing the necessary numbers of references from the original drawing to the reduction board and thence to the copy.

Fig. 3 shows the right-hand edge of the board and its holes, into two of which pegs (*p* 1)—see top right-hand corner of Fig. 1—are inserted to indicate the two particular circular segments selected for reducing any drawing. Fig. 2 shows the radial arm (*r*)—temporarily removed from the board to make Fig. 1 more clear—which is turnable around the reduction board on the screw-pin (*p*) in the centre (*a*) of Fig. 1. Its right-hand edge (*k*) is bevelled and graduated like the *zero-line scale* in Fig. 1. The top end (*s*) has a clamp (*s*) to hold the arm (*r*) in any desired position on the board.

To Reduce a Drawing in any Desired Ratio.—Tick off from the original drawing a line (*L*) on to the batten (*m*) and then (starting from the zero line) plot it as a chord (*Z-W*) of the circular segment indicated on the scale-zero line by 100 (see Fig. 1). We can then quickly reduce its length in any proportion desired (say) 100 to 50, *i.e.*, to one-half. Put index pegs (p. 1) into the side holes 100 and 50 as a guide to the eye, as these same two segments will be used for all the other reductions of this drawing. Having replaced the radial arm (*r*)—see Fig. 2—into its proper position on the board, bring its graduated (right hand) edge exactly up to the dotted line (*a V W*); clamp the arm in this position and mark on the reverse edge of the batten the half length (*l*) required, viz., chord *V–Z*, which can then be transferred to the reduced drawing. If several sub-divisions happen to cut a straight line drawn in pencil through the original drawing, these can all be ticked off on to the batten (see Fig. 5) at one operation and then (starting from the zero line) plotted, one after the other, as chords of the top circular segment, viz., 100, as indicated by the top peg (p. 1)—see top arc of Fig. 1. Having, as already explained, marked off on the reverse edge of the batten the *half* of chord *W Z*, viz. chord *V X*, as measured on arc 50, next unclamp the arm (*r*) and clamp it again in the next position as shown by the dotted line (*a V*). The decreased length *U X*, which is one-half of the chord *Y*-100, is then to be marked on the batten; after which the edge (*k*) of arm (*r*) is shifted in succession to the other four pencil marks on the 100 circular segment and their corresponding halves obtained from arc 50, between the zero line (*a X Z*) and the edge (*k*) of the arm where both of them are cut by the segment 50.

To increase a line in the reverse ratio—viz., 50 to 100—the process is simply reversed; *i.e.*, the length (*l*) from the original drawing is transferred by means of the batten (*m*) to the board and plotted as a chord on arc 50; the double length (*L*) required is the corresponding chord found on the top arc, viz., where the 100 arc cuts the edge of the arm (*r*) and the *zero line*.

In order to decrease a line in a desired ratio, is more obvious to plot it as a chord on arc 100 because the length of the chords of all the other smaller arcs are in the proportion of their respective scale readings. *E.g.*:—Decrease a line (*L*) in the ratio of 1 to (say) 0.465 (footnote *). Put pegs into holes 100 and 46.5. To increase in the reverse ratio the process is simply reversed.

Decrease a line (*L*) to ¼. For this the celluloid scale and radial arm scale may be marked (see footnote) at 33.3, in which case *L* is plotted as a chord on the 100 arc; but the alternative may be adopted of putting pegs into holes 96 and 32, and plotting *L* on arc 96.

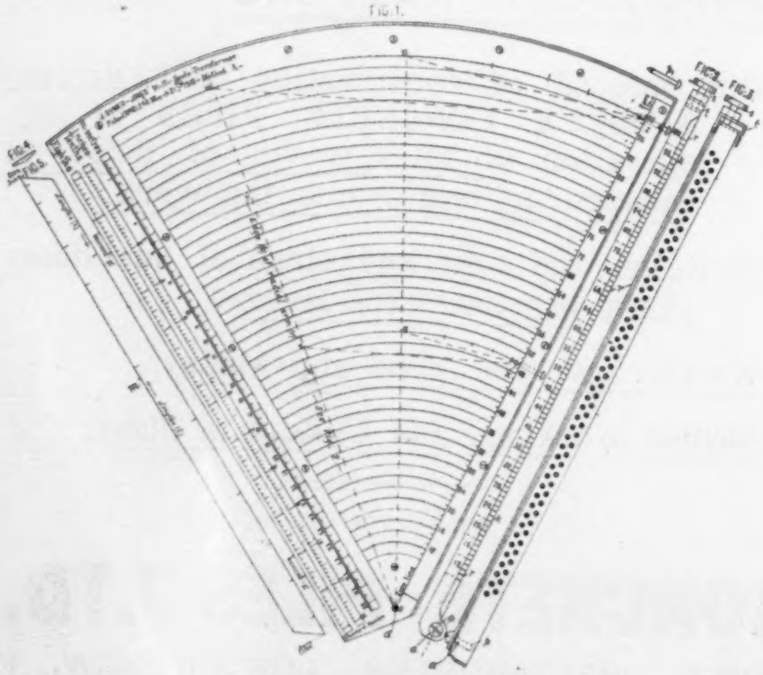
To decrease in the proportion of 3½ inches to the foot, *i.e.*, as 96 to 28 eighths. Mark *L* as a chord on arc 96 and then tick off the required length (*l*) between arm (*r*) and the zero line, where both are cut by the arc 28.

To decrease a drawing from ½ full size to ⅕ *i.e.*, as 0.25 to 0.20, use arcs 100 and 80.

Affixed to the back of the board are diagrams illustrating the reduction of a curve, &c., &c., from one scale to another; and tables giving decimal equivalents of vulgar fractions. The multiple-scale-transformer is an improvement on proportional compasses, which provide for only a few, and those widely differing, ratios, and offer very much less scope with regard to the length of line measurable at one time.

Finely divided scales are confusing and trying to the eyes and are unnecessary, because only the extreme limits of any line need be ticked off on to the batten when using the reduction board.

Measuring dividers—the prickings of which are not easily discernible unless so pronounced as to puncture the drawing, and do not conduce to accurate measurements—can be dispensed with. Reductions are very rapidly made.



The Multi-Scale Transformer.

South African Contracts.

The Capetown Master Builders' Association has adopted a tariff for executing work under a percentage system. The rate it is proposed to charge is 15 per cent. on the cost, to include the use of plant, establishment charges, supervision and profit.

Ground Rents at Lewisham.

Messrs. Daniel Smith, Oakley & Garrard recently offered a parcel of improved ground rents, amounting to £618 per annum (subject to a head rent of £13 10s. per annum) secured on sixty-one houses, forming part of the Granville Park Estate, Lewisham, with reversion to rack rents, estimated at £3,500 per annum, in about sixteen years. The purchaser could secure the freehold reversion belonging to the Earl of St. Germans for £6,100. The whole was bid for up to £10,000, at which price it was withdrawn. The interest was then offered in three separate parcels, but remained unsold. It is understood that the auctioneers are open to negotiate privately.

*There is no hole for a peg between arcs 46 and 47, but the celluloid scale may be marked by a pencil; and the radial arm (*r*) also in the same position—viz. 46.5—with an Indian-ink line; or 46.5 may be indicated by a peg in 46 and another in 47.

PORTABLE CONCRETE STRUCTURES.

WE publish the following communication from Mr. C. F. Mayfield who, we regret to say, passed away shortly after its receipt by us:—

There are so many ways of making and moulding concrete that at first sight there does not seem much scope for new methods. Yet it seems that there are a few untrodden paths, and I will try and show in what direction some of them lead.

The simplest concrete structure is the ordinary post, and when we have taken three pieces of board and put in four steel rods and cast the post it at first sight seems as if we could not get a simpler operation. Here let us take a step backward and see if we cannot do without the mould, if not altogether, at least after the first two or three posts are cast. This can be done if we take two pieces of wood 1½ in. thick, one of them 6 in. wide and the other 7½ in., and screw them together so as to form a pig-trough shaped mould, for a triangular post. This post would only require three steel rods, and it would take only half the concrete required for a 6 in. square post. When we have cast two of these posts we lay them on a level floor, and we have posts that will reproduce themselves like aldermen's gondolas. It will thus be seen that for every new post we make we have a fresh mould that costs nothing. From a post to a bridge or culvert seems a far cry, yet I have been applied to for both these structures in a portable form. One way of dealing with the culverts—which were about 6 ft. span—was to cast some pieces 8 ft. long and 14 in. wide by 9 in. thick. In each slab two Kahn bars were placed and stored ready to take to the first county culvert that showed signs of collapse. The edges of the pieces were fitted with a V-shaped tongue on one and a corresponding groove on the other, and fronted after being put into position. The bridge consisted of reinforced-concrete slabs slipped into three rolled-steel joists, with bolts right through the lot. As they were to be used in the fens, a raft, consisting of a reinforced slab 6 in. thick and turned up 4 in. at the ends to receive the joists was made. The rafts were 12 ft. long by 3 ft. wide, and were placed directly upon the top soil of the fen, as if the top spit were removed the raft would sink further and further into the subsoil. So light is this soil that 4 ft. to 6 ft. of it has blown away in 50 years. Now, if a post, a culvert or a bridge can be made portable, why not a portable concrete building? Here let me say that I do not propose to do more than indicate the direction in which it will be safe to experiment, with at least some reasonable hope of success. At the outset, if we can get some waste products to build with we shall make a great saving. Here comes the great chance for local observers. If we were in the Northern factory districts no doubt we could get plenty of engine ashes at a very cheap rate. Instead, we happen to be in the Ouse Valley, and, like the first fishermen who settled here, we cast about for materials for our building.

No doubt our primitive fisherman built his hut of willows and poplar branches and river reeds, and as time went on he probably floored it with a mixture of clay and gravel. By and by he daubed his reed walls with clay, and it really was wonderful to see how well he used this waste material and what good results he got with it.

How far we can copy his methods, and to what extent we can modernise them, should be a very interesting and profitable inquiry.

We need not consider the willows, but in concrete work we must shun the poplar as we would the 'flu, as the least bit of poplar chips is fatal to a batch. I sometimes wonder why. We can, however, with confidence summon the beds of gravel in the river to our aid, and they will furnish us with an ideal aggregate. This I have proved by practical experience, as I have won gravel from the river with a home-made dredger working from a barge, at a pre-war cost of 1s. 9d. per ton delivered to wharf. Nor does distance add much to the cost, as water transport is very cheap. Taking to-day's cost at double it would not cost more than 3s. 6d. per ton delivered to wharf, and for this we get an aggregate as cheap as it is good. But for our slabs we shall want some reinforcement. This leads us to the threshold of our experiment, for if we can get a substitute for steel we shall get a lighter structure and eliminate our most expensive item, except, of course, cement. Here I would suggest that it is well worth some one's while to try to reinforce slabs with river reeds. If the Lincolnshire builders could make a good bedroom floor with plaster laid on a foundation of reeds spanning the joists; if my grandfather could thatch a roof with reeds eighty years ago, and the roof still be in wear; if my father could do the same and the roof still carry dry to-day, we want no more or better evidence of its durability. It only then remains to test its strength. Analysts tell us it is largely made up of silica. Its cheapness is incontestible, it can almost be had for the asking.

To put it to its proper test I would suggest that a mould be made for a slab 8 ft. long 2 ft. 6 ins. wide, and 3 ins. thick. Into this mould should be placed a good half-inch of concrete. Then should come a mattress of reeds, the longer reeds spaced 1½ to 2 ins. apart, the shorter reeds placed 6 to 8 ins. apart. The mould should then be filled to within ¾ in. of the top, and a second mattress of reeds placed in position, and the mould completely filled. I suggest that one slab be made of cement and gravel concrete, and another one of blue lias lime and gravel concrete, the first for outside work and the second for inside work, such as partitions. We will now consider the best way to make our slabs into a portable building. For this purpose it will be necessary to adopt some unit, and as the buildings will vary more in length and width than in height, we will take the height as our unit. Everyone is familiar with the huts built on the sides of the railroads with sleepers by navvies, and some have had occasion to admire the ease and speed with which they are erected. Let us suppose that the building we require is 10 ft. square and between 7 ft. and 8ft. high:—

1. We first level our site and then get four scaffold boards. These we let into the ground edgewise, so as to leave the top edge from 4 to 6 inches out of the ground and quite level, and one foot each way larger than the intended size of the building.

2. Next we fill in with concrete up to within two inches of the top of the boards. We then take a piece of quartering 4½ ins. by 2 ins., and place it in position just where our walls are to stand.

3. We next fill in up to the top of the boards, and screed the four pieces of quartering in.

4. When the concrete has set we withdraw the quartering and this leaves a groove for the walls.

5. Upon this floor we cast sufficient slabs, 8 ft. long by 2 ft. wide and 2 ins. thick, reinforced with reeds as before described.

6. For the corner slabs we cast single slabs of the same thickness and height as the plain slabs, but reinforced with wire mesh about 6 ins. by 4 ins. square mesh. No. 8 wire should do very well.

7. As the slabs are to have a 4 in. lap, we must provide ¾ in. holes, 1 ft. 6 ins. to 2 ft. apart.

8. The method of building the slabs entirely without mortar is to put up a corner slab in the grooves provided; this is then plumbed and stayed in position.

9. Then the first plain slab is bolted to the back of the corner slab, allowing 4 in. lap. As the joint is to be made without mortar, we place a strip of bitumen felt between the two slabs and bolt them in position, but only hand-tight at first.

10. The end of the mould is so made that it can be suited to the rake of the roof.

11. Door frames are bolted in the same way as the slabs, and to avoid the shock of the doors banging on the concrete we have the doors in pairs so as to fit an opening 4 ft. to 6 ft. wide.

12. The top bolts are put in 2½ in. only from the top edge, and these answer a purpose.

First we prepare pieces of 4 ins. by 3 ins. with a bead on to form a strip, and when these are fixed in position to all four sides and at a distance of 1 in. from the top, they form the soffit of the roof slab. Before bolting these pieces on we procure strips of felt 6 ins. wide and place them on the top of the wall and bend the edges down 1 in. on each side.

This allows for a little expansion or contraction.

13. The top bolts are long enough to go through the 3 in. wood rim and their second use is to form a fixing for the brackets for the eaves

14. Next, we nail a 7 in. by 1 in. board all round the 4 in. by 3 in. pieces, keeping the top edge 3½ ins. above the top of the wall.

15. A steel mattress composed either of Hy Rib or Self-Centering is next laid on to the top of the wall, and a couple of bearers placed so as to divide the span into three equal widths and strutted up.

16. The roof slab is then cast in the usual way. Some cement mortar is used for filling the groove, and as soon as the roof slab is set the underside is plastered and the building is ready for occupation.

17. An alternative method of roofing is to use the slabs in the same way that the walling is done, as there is no reason why the felt should not make a water-tight joint, and a few bolts cast in the top of the slabs would be enough to hold the roof in position, and the slabs would only need light reinforcement.

I do not put these views forward as anything of a revolutionary nature, but I believe they offer to many working men a solution of the problem of how to build a cheap and durable structure, and one, withal, which can easily be removed if the necessity arises.

PATENTS.

APPLICATIONS PUBLISHED.*

16302/15.—Weller: Trussed sheet metal structure.

135,128.—C. Marques: Floor and ceiling construction.

128,536.—C. Candlot: Mixing of mortar, concrete, and like material.

135,132.—S. Kuroki and M. Nakayama: Waterproof paint.

135,135.—A. J. Smith: Door or window fastening.

135,144.—A. C. Auden: Domestic ovens, cooking stoves, &c.

135,233.—W. J. Howard-Smith: Concrete blocks for roadway paving.

135,236.—J. Emmett: Kitchen ranges.

135,248.—S. R. Parkes: Rim latches and the manufacture of the same.

135,262.—C. Weir: Means of heating air.

135,277.—Osmosis Co. and J. S. Highfield: Mining or quarrying of clay.

135,300.—D. Parkins: Folding counters and furniture.

135,304.—J. Grice: Moulding concrete blocks.

135,350.—B. S. Hastings: Combination cash registering lock for doors.

135,366.—J. A. Lane: Opening, closing and locking apparatus for casement window sashes and shutters.

135,375.—A. E. Heley and T. W. Aitken: Rising hinges.

135,380.—J. O. Spong: Air heating appliances or fittings for use with open fire-places.

135,393.—B. Goldman: Skylights.

135,404.—E. M. Meyer: Combined hinges and fastenings for doors and windows.

* All these applications are now in the stage in which opposition to the grant of Patents upon them may be made.

SCIENTIFIC MANAGEMENT.

In a paper recently read before the Institution of Electrical Engineers on "Scientific Management: A Solution of the Capital and Labour Problem," Mr. J. M. Scott Maxwell, B.Sc., said that in applying the principle of cheap production, it must not be confused with the act of buying commodities. Labour must cease to be regarded as a commodity, which was one of the worst legacies of the old system. Increased output and payment-by-result was the sound foundation on which to build, but it ought to include everyone, from the managing director down, and both these aims should be qualified by another—a better life for the worker. Scientific management increased output, and because it could accurately measure the work done in terms of human effort, payment-by-result was the fair and natural sequel. It achieved this greater output by lessening the task and raising the status of the worker.

Scientific management affected the individual as a unit worker, the workers as a group, and therefore trade unionism, and it affected all industry in its relation to the Government and to the consumers, and thus involved the whole nation. Progress would only commence in earnest when the labour leaders grasped the full meaning to the worker of the elimination of useless work, which would lessen the total burden of labour; and when they realised that the accurate measuring of work protected the worker from under-payment, and that the greater all-round efficiency made shorter hours and higher wages a just claim on the community.

Scientific rate-fixing involved three problems:—(1) The analysis of the job into its elemental operations by means of an investigation into the best method of accomplishing the desired result; (2) the execution of the job by a first-class man, with the best possible tools and equipment, and the timing of each elemental operation thus carried out; (3) the investigation of the factors of environment and nature of the work as it affected the physical and mental capacity of the worker. Where a job had already been performed in the usual rule-of-thumb manner, motion study always came first. Where a new job was to be performed for the first time under the Taylor method motion study or analysis might not be necessary, as sufficient data might already be in existence to give both the best method and the correct times. The process of fixing rates then became a synthetic one.

Motion and time study gave the minimum time on the job under the best possible conditions with all rest pauses eliminated. Should a better machine or tool be designed, the new time for these new conditions was arrived at in a similar manner. The objective was to set "times" so that not only was there no over-strain at the actual time of operation and no loss of interest in the work done, but that there was no chance of physical or mental hurt resulting to the worker in the future from the work done to-day.

The ignorance of employers, and especially of the Government which urged heavy overtime during the first years of the war, brought about abnormal fatigue amongst many of the munition workers. Because of this evil experience, the Government was now interested in industrial fatigue, and sooner or later the experts were bound to see that an accurate knowledge of fatigue would also demand the standardisation of normal industrial conditions and the means of accurately measuring the human effort required to produce a certain result.

With the best possible system of management it was still necessary to give incentive to the worker if maximum output was to be obtained. The best incentive to steady and efficient work was provided by a payment to the individual worker as soon as possible after the job was finished. With correct times it was not necessary to cut the rates as masters had always done on piece work, which behaviour on their part was one of the principal causes of the restriction of output by the men. With scientific management the masters did not require to protect themselves by elaborate premium systems which the men did not understand and which thus aroused their suspicion and antagonism. The difficulty with the differential piece-rate was that rates as set by scientific management were based on the standard minimum time. Even with the fullest instructions the workers required some time to get out of the old inefficient method and become experienced in the new. Scientific management did not urge any special system of piece-work or premium bonus. Any of them which provided incentive would do, but the simpler the better.

The share of the saving effected which should be allocated to the worker must be determined by the employers' federations and trade unions. The trade unions had always professed hatred of both piece-work and premium bonus, but more especially the latter, as they thought that the former gave the worker more control over his time. With scientific management making it possible to measure labour effort accurately, premium bonus gave more steady incentive than piece-work, and thus meant more output and more pay for the worker. The worker was guaranteed his hourly wages at the start, and if after reasonable time he did not come up to the standard and earn a fair bonus he must be found other work better suited to him.

Scientific management made a study of the man and selected the best man for the job. It differentiated and graded labour, and that was another reason why the trade unions were against it. In the initial stages of the struggle against the employers the unions had to fight on the basis of the average man. Now that the unions had won full recognition in this country so that non-unionists were not recognised in negotiations between masters and men, it seemed no longer a sound policy for the unions to continue to penalise their best men by maintaining a medium standard of work and pay for all degress of skill and experience. Statistics showed that 50 per cent. of strikes were due to local troubles, none of which should arise under scientific management correctly applied. The elimination of 50 per cent. of strikes would still further reduce the remainder, due to the general industrial atmosphere being so much clearer.

After analysing the job, fixing the time and method of payment, and selecting the proper man, scientific management then proceeded to teach the man how the job should be done. The teachers were the best men picked out of the shop. A worker who had been instructed carefully and sympathetically in this manner would naturally be able to do better and more difficult work than under the present system. Scientific management raised both the teacher and the worker to a higher level of intellect and character. The close contact of the worker with the more highly trained and intelligent instructor and the knowledge and habits acquired by working in the best possible manner, were gains to him which would affect his mental attitude far beyond the confines of his job, no matter how simple it was. The ability to do more work and better work with the same or less energy than previously required for inferior work, combined with the incentive of a higher reward, increased his power of concentration and consequently his interest in the work.

The Commercial Motor Users' Association.

The Commercial Motor Users' Association (Inc.) has now moved into its new offices at 50, Pall Mall, London, S.W.1, and communications should in future be addressed to Mr. F. G. Bristow, F.C.I.S., General Secretary. The telephone number and telegraphic address are Regent 5282, and "Usamobile, London," respectively. The membership roll has increased by upwards of 1,000 during the past few months, and the National Council anticipates that the year 1920 will be the most successful in the history of the Association, of which Mr. E. S. Shrapnell Smith, C.B.E., is chairman.

PROPOSED NEW BUILDINGS AND OTHER WORKS.*

In these lists care is taken to ensure the accuracy of the information given, but it may occasionally happen that, owing to building owners taking the responsibility of commencing work before plans are finally approved by the local authorities, "proposed" works, at the time of publication, have been actually commenced. Abbreviations:—T.C. for Town Council; U.D.C. for Urban District Council; R.D.C. for Rural District Council; E.C. for Education Committee; B.G. for Board of Guardians; L.C.C. for London County Council; B.C. for Borough Council; and P.C. for Parish Council.

BALLYMENA.—Mr. A. D. Price, Engineering Inspector of the L.G.B., has held an inquiry into an application by the Council to the L.G.B. for sanction to two loans of £20,000 each for the purpose of erecting a new Town Hall and vertical retorts at the gas works.

BARNSTAPLE.—The R.D.C. has decided to join with the Barnstaple Port Sanitary Authority in the cost of preparing plans for a joint isolation hospital.

BRIDLINGTON.—Plans passed:—Mr. J. H. Hudson, porch to house in Flamborough-road, for Mr. Gypson; Mr. H. T. Field, two houses on the north side of Flamborough-road, for Mr. H. Eckles; Messrs. Blackmore & Sykes, workshop and covered yard at the rear of No. 9, Prospect-street, for Mr. F. Usher; garage at Polar Chalet, Cardigan-road, for Mr. W. Buckley; sale room and offices in Prospect-street, for Mr. T. R. Jemison; house in Cardigan-road, for Major Stevenson; Mr. G. D. Shields, alterations to premises in Prince-street, for the B.S.E. Garage Co.; Mr. C. F. Johnson, alterations to house in High Green, for Mr. A. Spencer; Mr. J. R. Earnshaw, alterations to house "Falconhurst," Victoria-road, for Mr. Nolan.

ETON.—Plans passed by R.D.C.:—Alterations to "Greenholme," Gerrard's Cross, for Mr. A. Moorhouse; additions to a cottage at Wexham-street, for Mr. B. Oppenheimer; alterations to Heatherden Hall, Iver Heath, for Colonel Grant Morden, M.P.; out-houses at Iver, for Mr. D. Arthur; six cottages at Iver, for Colonel Grant Morden, M.P.; residence at Gerrard's Cross, for Mrs. Ada.

ILFORD.—Plans passed by U.D.C.: Mr. W. J. Hobbs, seven houses in Clarence-avenue; Chas. Heathcote & Sons, roof lead over furnace at Fuller's Electrical Works; Messrs. Cockrill & Cockrill, 4, Gray's Inn-square, W.C. 1, additions to workshop at 363, High-road, Ilford; Messrs. P. E. Brand, additions, 38, Beehive-lane; Messrs. P. E. Brand, two houses, Cranbrook-road; Messrs. Hammond & Miles, for A. W. Green, alteration to 86, High-road; Mr. W. H. Knox, eight bungalows in Balmwood-road; Mr. F. D. Smith, vehicle shelter, Victory Garage, Ilford-lane; Mr. C. O. Norwood, garage, 249, High-road; Mr. W. B. Bickers, garage and tool shed at 2, York-road; Mr. W. H. Knox, seven houses, 20-32, Water-lane; Mr. A. P. Griggs, eleven houses, St. Andrew's-road; Hammond & Miles for "Recorders, Ltd." Additions to Recorder Works, 169, High-road.

ILFRACOMBE.—The U.D.C. has decided to ask the Housing Commissioners to approve the erection of 64 houses on sites owned by Messrs. Pile, G. Parkin, Robins, and W. H. Gubb, who have submitted block plans.

ISLEWORTH.—Plans passed by U.D.C.:—From F. J. Fisher & Son, lavatory, &c., South-Western Hotel, Hounslow; from Mr. W. Stewart, rebuilding "Rising Sun" P.H., London-road, Isleworth; from the Isleworth Rubber Co., Ltd., for additions to factory, Worple-road, Isleworth; from Pearman & Ashfold, Ridgeway-road, Isleworth; from H. J. Morgan, bungalow residence, St. Stephen's-road, Hounslow; from Jackman & Baldwin, four houses, Osterley-road, Isleworth; from Roper, Son & Chapman, store, 57, Whitton-road, Hounslow; from W. Leighfield, motor garage, "Parkhurst," Jersey-road, Osterley, Isleworth.

LEWISHAM.—Plans passed by B.C.: Reconstruction of drainage, 2, Rushey-green, for Messrs. J. Hyam & Son; garage, Bromley-road, for Messrs. T. Sawyer & Son.

LISCARD.—A scheme is on foot for the erection of a picturedrome at the junction of Liscard Village and Seaview-road.

PRESTON.—Plans passed by T.C.:—Messrs. J. H. & W. C. Mangan, reconstruction, 82 Fishergate, for Mr. E. Bradshaw; Messrs. Briggs & Thornely, extension to premises, Mill-hill, for Mr. H. Shutt; Mr. E. J. Andrew, motor garage, Lang's-yard, Park-road, for the Ribble Motor Service, Ltd.; Mr. E. J. Andrew, alterations and additions, Acregate-lane, for the Ribble Motor Service, Ltd.; Mr. Henry Heaton, additions, &c., Eldon-street, for Mr. Richard Rhodes; Messrs. J. H. & W. C. Mangan, conversion of school to cinema-house, St. Paul's-road; Mr. W. G. Crossthwaite, extensions, Hopwood-street, for Messrs. Attwater & Sons; Mr. Joseph Barnes, garage, &c., Brewster-street; Mr. E. B. Harrop, cinema theatre, Corporation-street; Mr. A. Winstanley, motor garage, Tulketh Brow; Mr. William Houghton, motor garage, Stuart-road; Messrs. J. R. & A. Smith, chimney, Fletcher-road.

SAFFRON WALDEN.—It has been decided that the War Memorial, to be erected in the centre of the High-street, shall be a regular octagon, 25 ft. high, made of Portland stone, with bronze tablets bearing the arms of the borough and the names of the fallen. The probable cost is about £1,000.

SCARBOROUGH HALL.—The sum of £20,000 has been promised towards the cost of building a new Mission Hall on the side of the Scarborough Queen-street

* See also our List of Competitions, Contracts, &c.

Wesleyan Chapel. The cost is estimated at between £22,000 and £25,000.

WALTHAMSTOW.—Plans passed by U.D.C.:—Additions to workshop, 13, Newbury-road, for Mr. A. Wood; addition to house, 32, Castle-avenue, for Mr. R. F Fenn; alterations, 39, 41, 43 and 45, Cambridge-road for Mr. J. Holland.

WALTON-ON-THAMES.—Plans passed by U.D.C.; Concert hall for Mr. A. W. Love.

WESTMINSTER.—It is reported that contracts have been signed and plans are in hand for a new building, with frontage upon Pall Mall and Waterloo-place, for Cox's Bank.

WEST RIDING.—The West Riding Rivers Board has decided to ask the Gildersome and Elland Urban Councils each to prepare a scheme for the improvement of their sewage works; also that the Golcar, Marsden, and Slaithwaite Urban Councils be asked to consider the question of adopting a joint scheme to deal with the sewage of Marsden, Slaithwaite, and the portion of the Golcar district now drained to the Crimble Sewage Works.

WILLESDEN.—Plans passed by U.D.C.: alterations and additions, 107-109, Salusbury-road, by Mr. W. L. Trant Brown, for Messrs. Delacour Bros., Ltd.; motor garage, The Croft, Harlesden, by and for Messrs. Beeson Bros.; new lavatories, &c., Waxlow road, by Mr. T. W. Willard, for Messrs. McVitie & Price, Ltd.; packing room, Winchelsea-road, by Mr. H. Shaw, for the Harlesden Lamp Co., Ltd.; alterations, 65, Salusbury-road, by and for Mr. C. A. Wiseman; timber store, Oxgate-lane, by Messrs. L. & W. Whitehead, for Messrs. Bratt, Colbran & Co., Ltd.; addition to workshop, 27, Mortimer-road, Kensal Rise, by Mr. H. Shaw, for Mr. H. A. Dovell; drainage, new factory, Pound-lane, by Mr. Gerald Warren, for the British Ensign Motors, Ltd.; extension to enamel shop, Central Works, Cricklewood, by and for Messrs. S. Smith & Sons, Ltd.; covered shed, Oxgate-lane, by Mr. P. C. Blow, for Messrs. Bratt, Colbran & Co., Ltd.; factory, Acton-lane, by Mr. F. Nicholas, for Messrs. Beckett, Laycock & Watkinson; extensions to new buildings, Cricklewood Broadway, by and for Messrs. S. Smith & Sons (M.A.), Ltd.; first floor addition to boiler-house, Central Works, Cricklewood Broadway, by and for Messrs. Smith & Sons (M.A.), Ltd.; building over plating and polishing shop, Central Works, Cricklewood, by and for Messrs. S. Smith & Sons (M.A.), Ltd.; extension of workshop, Shrewsbury-road, by Mr. W. Mann, for the Pattern Makers (Eng.) Co., Ltd.; convert stable to garage, 47, Hazel-road, Kensal Rise, by Mr. G. A. Sexton, for Mr. S. A. Pike; extensions of Twyford Abbey Works, Barrets Green-road, by Mr. G. A. Sexton, for Messrs. H. W. Cox & Co., Ltd.; office, Willesden-lane, by Mr. G. A. Sexton, for Messrs. Dack & Co.; garage of 45, Chamberlayne-road, Kensal Rise, by Mr. G. A. Sexton, for Messrs. Bishop's Stores, Ltd.; furniture depository at rear of 31, Priory Park-road, by Mr. G. A. Sexton, for Messrs. H. Sabey & Co.

CHELMSFORD.—Plans passed by T.C.: Shop front and warehouse, 57-61, New Writtle-street, for Messrs. Burrell & Dobnam; mart for motors, Fairfield-road, for Mr. L. G. Tom.

EAST HAM.—Plans passed by the B.C.: Garage, 200, High-street North, for Mr. S. B. Balon; conversion of dwelling house and additions, 40, Poulett-road, for Mr. W. S. Luton; store, 64, High-street North, for Messrs. J. Stokes & Sons; cinematograph theatre, High-street North, for Mr. Clifford A. Aish; cinematograph theatre, rear of "Coach and Horses" public house, for Messrs. Adams & Coles.

MERTHYR TYDVIL.—Mr. H. Seymour Berry has offered ten acres of land as a site for a hospital for Merthyr Tydvil, and to build a temporary hospital at a cost of £10,000. Should the authorities of the town decide to erect a permanent hospital, he will contribute a further £10,000, provided the town raises £100,000 for the endowment of the institution.

SPALDING.—The trustees of the Spalding Johnson Hospital propose spending a sum of £2,000 on improvements.

FIRES.

ATHLONE.—Damage amounting to £5,000 was caused by a fire at Geoghegan's coach factory, Athlone, last week.

BRADFORD.—On Christmas Day a fire occurred at the premises of Messrs. W. & H. Thompson, and Messrs. Black & Co., Victoria Mill. Damage estimated at £100,000 was caused.

GLASGOW.—Damage estimated at £1,000 has been caused by a fire in the premises occupied by Messrs. Hannan & Buchanan, engineers' furnishers at 75, Robertson-lane.

WHITEHAVEN.—A fire has occurred at the premises of Messrs. Whittle & Son, Roper-street, and caused considerable damage.

The Census of Production.

The Board of Trade has directed that a Census of Production shall be taken in the year 1921. The scheduled trades include building and contracting, brick and fireclay, and cement. Returns will not be required from persons, companies, or firms who do not employ on the average more than five persons, exclusive of officers of the company, or members of the firm, during the year 1920, provided that signed declarations are made of the average number employed.

Competitions, Contracts, &c.

For some contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this number. Contracts vi: Competitions vi. Public Appointments cxvi; Sales by Auction cxxii. Certain conditions beyond those given in the following information are imposed in some cases, such as that advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bona-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements, and that, while every endeavour is made to ensure accuracy, we cannot be responsible for errors that may occur.

BUILDING AND PAINTING.

JANUARY 5.—**Bedwellty.**—HOUSES.—The U.D.C. invite tenders for the erection of the following houses:—96 houses near Twyn-y-ffald, between Pengam and Blackwood; 26 houses Bedwellty-road and Commin-road, Aberbargoed; 10 houses Penylan-avenue, Argoed. Quantities of Mr. Dan. H. Price, Surveyor to the Council, Aberbargoed. Deposit £4 4s.

JANUARY 5.—**Darlington.**—WAREHOUSE.—Tenders are invited for the erection of a Central Warehouse for the Darlington Co-operative. Quantities at the Office, Priestgate, Darlington.

JANUARY 5.—**Haverhill.**—HOUSES.—The U.D.C. invite tenders for the erection of ten houses, Class B, at Wratting-road, Haverhill. Quantities of the architect, Mr. H. Brown Thake, 10, High-street, Haverhill. Deposit £2 2s.

JANUARY 5. — **St. Marylebone.**—ALTERATIONS.—The Guardians of St. Marylebone invite tenders for alterations to the Medical Superintendent's Residence, at the Infirmary, Rackham-street, Ladbroke-grove, W. Specifications of the architect, Mr. T. W. Aldwinckle, F.R.I.B.A., 20, Denman-street, London Bridge, S.E.1.

*JANUARY 5.—**Uxbridge.**—HOUSES AND ROADS.—The U.D.C. invite tenders for the erection of 21 pairs of working-class dwellings and for forming new road and sewers on site, George-street and Montague-road, Uxbridge, Middlesex. Quantities of the Council's architect, Mr. William L. Eves, F.R.I.B.A., F.S.I., 54, High-street, Uxbridge. Deposit £3 3s.

JANUARY 6. — **Taunton.**— HOUSES. — The Town Council invites tenders for the erection of two blocks of four houses on the Leslie-avenue site. Quantities of Mr. D. Edwards, A.M.I.C.E., Borough Engineer, Municipal Buildings, Taunton. Deposit £2 2s.

JANUARY 7.—**London.**—The Guardians of Westminster Union invite tenders for alterations and additions to the Medical Superintendent's House at their Infirmary in the Fulham-road, S.W.

JANUARY 7.—**Marlow.**—HOUSES.—The U.D.C. invite tenders for the erection of 20 houses. Quantities of Mr. L. Shore, clerk, 41, High-street, Marlow. Deposit, £2 2s.

JANUARY 7.—**Sevenoaks.**—The Sevenoaks R.D.C. invite tenders for the erection of 24 houses and making new road at Sundridge in their Rural District.

JANUARY 7.—**South Shields.**—HOUSES.—The Corporation invite tenders from the members of the Building Trades Federation for the erection of the whole or part of 215 houses on the Cleadon Park Estate. Quantities of Major Leslie Roseveare, M.I.C.E., Borough Engineer, Town Hall, South Shields. Deposit £1 1s.

JANUARY 7.—**Westminster.**—ALTERATIONS.—The Guardians invite tenders for alterations and additions to the Medical Superintendent's House at their Infirmary in the Fulham-road, S.W. Quantities of Mr. W. J. Lickley, Clerk to the Guardians, Guardians' Offices, Princes-row, Buckingham Palace-road, S.W. 1.

JANUARY 9.—**Enniskillen.**—STORES.—The United Co-operative Baking Society invite tenders for the erection of flour stores and bakery. Quantities of Mr. J. Donnelly, architect, Enniskillen.

JANUARY 9.—**Henley-on-Thames.**—The Commissioners of H.M.O.W. invite tenders for the erection of a new head post-office at Henley-on-Thames.

JANUARY 9.—**London.**—The Commissioners of H.M.O.W. invite tenders for the extension of the Sorting Office at Walthamstow, E.

JANUARY 9.—**London.**—The Commissioners of H.M.O.W. invite tenders for the extension of the Telephone Exchange at Tottenham, N.

JANUARY 9.—**Ongar.**—HOUSES.—The R.D.C. invite tenders for the erection of seventeen houses in the Chase, at Marden Ash, Ongar. Quantities of the Surveyor of the Council, The Council House, Chipping Ongar. Deposit, £2 2s.

JANUARY 9.—**Wigton.**—HOUSES.—The U.D.C. invite tenders for the erection of twelve houses (six pairs) as first portion of the scheme. Quantities of the Architect, Mr. John J. Davison, 6, King-street, Wigton. Deposit £3 3s.

JANUARY 10.—**Chippenham.**—HOUSES.—The T.C. invite tenders for the erection of a block of four and a pair of cottages. Quantities from Mr. A. E. Adams, Borough Surveyor, Chippenham, Wilts. Deposit £1 1s.

JANUARY 10.—**Congleton.**—COTTAGES.—The Housing Committee invite tenders for the erection of fifteen cottages, on the Bromley-lane site. Quantities from Mr. J. H. Walters, borough surveyor, Town Hall, Congleton. Deposit £3.

JANUARY 10.—**Droitwich.**—HOUSES.—The Council invite tenders for the erection of twelve Class A houses in the Holloway, Droitwich. Quantities of Mr. Hy Hulse, borough surveyor, 105, Friar-street, Droitwich. Deposit £2 2s.

JANUARY 10.—**Horbury.**—ARCHES.—The County Council of the West Riding of Yorkshire invite tenders for the rebuilding of two arches at Horbury Bridge, over the River Calder. Particulars of Mr. F. G. Carpenter, West Riding Surveyor, County Hall, Wakefield.

JANUARY 10.—**Salford.**—SANATORIUM.—The Corporation invite tenders for the erection of a sanatorium at Nab Top, Marple. Quantities of the architect, Mr. John Cubbon, F.R.I.B.A., 42, John Dalton-street, Manchester. Deposit £2 2s.

JANUARY 12.—**Conway.**—The Corporation [of Conway invite tenders for the erection of houses in connection with their housing schemes A and C.

JANUARY 12.—**Portsmouth.**—ADDITIONS.—The Corporation invite tenders for making additions to wind screens at the South Parade Pier. Specifications of the Borough Engineer, Portsmouth.

*JANUARY 13.—**Forest Gate.**—EXTENSION.—The Commissioners of His Majesty's Works invite tenders for the extension of the Post Office and Sorting Office at Forest Gate, E. Quantities from the Director of Contracts, H.M. Office of Works, Storey's Gate, Westminster, S.W. Deposit £1 1s.

*JANUARY 13.—**Ilkeston.**—The Commissioners of H.M.O.W. invite tenders for the erection of a new Post Office at Ilkeston.

JANUARY 13.—**Llanelly.**—HOUSES, ROADS AND SEWERS.—The R.D.C. invite tenders for the construction of roads and sewers in connection with the erection of 36 houses at Tal y Clun, Llangennech, and the erection of 44 houses and the construction of roads and sewers at Llech y Fedach, Tumble. Quantities of the architects, Messrs. W. Griffiths & Son, Falcon Chambers, Llanelly. Deposit £2 2s.

*JANUARY 13.—**Uxbridge.**—The U.D.C. invite tenders for the erection of 21 pairs of working-class dwellings and for forming new road and sewers on site, George-street and Montague-road, Uxbridge, Middlesex.

JANUARY 14.—**Ashby-de-la-Zouch.**—HOUSES AND ROADS.—The Council invite tenders for:—(1) The erection of sixty houses on Smisby-road site; (2) construction of roads and laying sewers. Quantities of the architects, Messrs. Baines & Provis, A.R.I.B.A. and M.S.A., 16, Friar-lane, Leicester. Deposit £2 2s.

JANUARY 14.—**Blore.**—HOUSES.—The Blore Heath R.D.C. invite tenders for the erection of 30 houses. Quantities of Mr. R. Matthews, Architect and Surveyor, Parrs' Bank Chambers, Nantwich. Deposit £2 2s.

JANUARY 14.—**Brighton.**—HOUSES.—The Corporation invite tenders for the erection in brick of 479 houses on the Moulescombe Estate. Quantities of the Borough Surveyor, Town Hall, Brighton. Deposit 10s. 6d.

JANUARY 14.—**Manchester.**—Tenders are invited for extensive works of alteration, sanitary, heating, lighting (electric) culinary installations, lifts (electric) works of decoration, &c., of the Manchester Hotel, Aldersgate-street, London, E.C., for Messrs. R. E. Jones, Ltd.

JANUARY 14.—**Market Drayton.**—HOUSES.—The R.D.C. invite tenders for the erection of about 50 houses. Quantities of Mr. R. Matthews, Architect and Surveyor, Parrs Bank Chambers, Nantwich. Deposit £2 2s.

*JANUARY 15.—**Lambeth.**—The Metropolitan Borough of Lambeth Council invite tenders for the erection of some or all of 139 dwellings to be built on the Holderness House Estate, Knight's-hill, West Norwood.

JANUARY 15.—**Whitefield.**—HOUSES.—The U.D.C. invite tenders for the construction of 16 houses at Elms-street. Quantities of the Council's Architect Mr. George M. Denton, Council Offices, Whitefield. Deposit, £2 2s.

JANUARY 16.—**Bournemouth.**—HOUSES.—The T.C. invite tenders for the erection of the second instalment of 100 cottages under the housing schemes. Particulars of Mr. F. P. Dolamore, borough engineer, Municipal Buildings, Bournemouth.

JANUARY 16.—**Darlington.**—HOME.—The Committee invite tenders for the erection of the Church of England Waifs' and Strays' Home, Darlington. Quantities of Messrs. Joseph Potts & Son, Architects, 12, Eldon-square, Newcastle-on-Tyne. Deposit £2 2s.

JANUARY 16.—**Preston.**—BATHS.—The Corporation invite tenders for the erection of baths. Quantities of the Borough Surveyor, Town Hall, Preston. Deposit, £1 1s.

*JANUARY 17.—**Beverley.**—HOUSES.—The Corporation invite tenders for the erection of 12 houses on the Grovehill-road site. Quantities of Mr. J. Willis Mills, Town Clerk, 31, Lairgate, Beverley. Deposit, £1.

JANUARY 19.—**Swansea.**—HOUSES.—The R.D.C. invite tenders for the erection of the following groups of houses:—(1) Eighty houses in Dantwyn and Glynbir-roads, Pontardulais. (2) Thirty-four houses in Frampton and Alexandra-roads, Gorseinon. (3) Eighteen houses in Mount-street and Mansel-street, Goverton. (4) Forty-eight houses in Culfor-road and Glebe-road, Loughor. (5) Twelve houses in Gorseinon-road, Penllergaer. (6) Fourteen houses in New-road, Grovesend. Quantities of Mr. Edward Harris, Clerk, £2 2s.

*JANUARY 20.—**London.**—ALTERATIONS.—The Commissioners of His Majesty's Works invite tenders for alterations to the National Gallery, London. Quantities from the Director of Contracts, H.M. Office of Works, Storey's Gate, Westminster, S.W. Deposit, £1 1s.

*JANUARY 20.—**Newcastle-on-Tyne.**—The Commissioners of H.M.O.W. invite tenders for the erection of offices for the Ministry of Pensions at Newcastle-on-Tyne.

NO DATE.—**Bursham.**—CONVERSION.—Tenders are invited for conversion of business into club premises for the Trustees of the Burslem Conservative Club. Names to Messrs. Walton & Adams, Architects, Burslem.

FURNITURE, MATERIALS, etc.

JANUARY 2.—**Bourne.**—GRANITE AND SLAG.—The R.D.C. invite tenders for the supply of about 5,000 tons of granite and 1,000 tons of slag. Forms of tender of Mr. Thomas Lake, District Surveyor, Bourne.

JANUARY 5.—**Halifax.**—MATERIALS.—The C.C. invite tenders for stores and materials required for the Tramways Department during one year. Forms of tender from the Tramways Engineer, Tramways Office, Skircoat-road, Halifax.

JANUARY 5.—**Halifax.**—MATERIALS.—The T.C. invite tenders for materials required in the electricity department. Forms of tender at the office, Foundry-street, Halifax. Schedules 1s. per copy.

JANUARY 5.—**Hornsey.**—MATERIALS AND SERVICES. The B.C. invite tenders for road and other materials, and also for cartage, sewer and drainage works, &c. Forms of tender of Mr. E. J. Lovegrove, borough engineer, Town Hall, Highgate, N.

JANUARY 5.—**Teddington.**—WAGON.—The U.D.C. invite tenders for a 5-ton steam tipping wagon. Specification of Mr. Marshall Hainsworth, surveyor, Elmfield Teddington.

JANUARY 7, 1920. — **Easthampstead.** — ROAD MATERIALS.—The R.D.C. invite tenders for the supply of road material (broken and unbroken). Forms of tender from the surveyor of highways, Mr. J. R. Treadwell, Council Offices, Bracknell.

JANUARY 9.—**Beverley.**—MATERIALS.—The East Riding of Yorkshire County Council invite tenders for the supply of broken Whinstone granite, tarred and untarred slag, tar for spraying and tar for grouting. Forms of tender of the County Surveyor, County Hall, Beverley.

JANUARY 10. — **Manchester.** — MATERIALS. — The Guardians of this Union invite tenders for the supply of the Crumpsall Institution, Crescent road, Manchester, of timber, painting materials, &c. Quantities of Mr. Hargreaves, Superintendent of Works, Union Offices, All Saints, Manchester.

JANUARY 11. — **Ruislip. — Northwood.** — ROAD MATERIALS.—The U.D.C. invite tenders for 30,000 gallons of tar and for granite or limestone chippings. Particulars of Mr. E. R. Abbott, Clerk, Council Offices, Oaklands Gate, Northwood.

JANUARY 12.—**Canterbury.**—MATERIALS.—The T.C. invite tenders for road and other materials. Specification of Mr. A. C. Turley, City Surveyor, Municipal Offices, Canterbury.

JANUARY 12.—**South Stoneham.**—GRANITE.—The R.D.C. invite tenders for the supply of British Macadam. Forms of the District Surveyor, Mr. F. Heather, West End Cottage, West End, near Southampton.

JANUARY 13.—**Wandsworth.**—MATERIALS.—The B.C. invite tenders for road materials and tar-spraying. Specifications of Mr. D. A. Nicholl, Town Clerk, Council House, Wandsworth, S.W.

JANUARY 17.—**Plymouth.**—MATERIALS.—The T.C. invite tenders for materials used in the various sewers Schedules of Mr. T. P. Frank, Borough Engineer Municipal Offices, Plymouth.

JANUARY 17, 1920.—**Weston-super-Mare.**—ROAD MATERIALS.—The Somerset C.C. invite tenders for road materials and steam rolling. Forms of tenders from Mr. Edward Stead, county surveyor, Weston-super-Mare.

JANUARY 19.—**Altrincham.**—PIPES.—The U.D.C. invite tenders for the supply and delivery of about 3,000 lineal yds. of second quality socketed earthenware pipes (18 in., 15 in., 12 in. and 9 in. diameter); also about 50,000 4 in. agricultural field drain tiles. Forms of tender from the Engineer, Mr. C. E. Newton, 19, Cooper-street, Manchester.

ENGINEERING, IRON AND STEEL.

JANUARY 5.—**Gartcosh.**—STEELWORK.—The Directors of the Caledonian Railway Co. invite tenders for the providing and erection of a foot-bridge over the railway at Gartcosh. Schedule of the Company's Engineer, Buchanan-street Station, Glasgow. Deposit, £2 2s.

JANUARY 7.—**Bootle.**—WIRING.—The Corporation invite tenders for the wiring of the first 34 houses under their housing scheme. Specifications from the Borough Electrical Engineer, Electricity Works, Pine-grove, Bootle.

JANUARY 12.—**Southampton.**—PUMPS.—The Corporation invite tenders for supplying and fixing:—(1) Two 10 in. centrifugal pumps and motors, together with the necessary suction and delivery pipes, at the Pumping Station, Bevois Valley; (2) one 18 in. and one 24 in. centrifugal pump and motors, together with the necessary suction and delivery pipes at the Pumping Station, Northam. Particulars of the borough engineer (Mr. J. A. Crowther), Market Chambers, Southampton.

JANUARY 13.—**London.**—STEEL MATERIALS.—The Bombay, Baroda and Central India Railway Co. invite tenders for the supply of steel material. Specification of Mr. S. G. S. Young, Secretary, Offices, 110, Bishopsgate, E.C. 2. Fee, 20s.

JANUARY 20.—**Bournemouth.**—TRAMWAY TRACK.—The Tramways Committee invite tenders for reconstruction of permanent way (equal to about 12 miles of single track). Quantities of Mr. J. Bulfin, Tramways Offices, Lansdowne-crescent, Bournemouth. Deposit, £3.

ROAD, SANITARY, AND WATER WORKS.

JANUARY 5.—**Mansfield.**—SEWERAGE.—The Corporation invite tenders for the laying of 500 yards of 15 in. stoneware pipe, detritus pits, settling tank, 60 ft. diam ter percolating filter and humus tank at Pleasley-hill. Quantities of Mr. Waude Thompson, Borough Engineer, Market-street, Mansfield. Deposit £2 2s.

JANUARY 5.—**Otley.**—STREETS AND SEWERS.—The U.D.C. invite Tenders for the construction of the streets and sewers in connection with their housing scheme at Newall. Quantities of Mr. A. G. Adkin, Lic.R.I.B.A., The Chambers, Ilkley. Deposit £2 2s.

JANUARY 5.—**Weston-super-Mare.**—WATERWORKS.—The U.D.C. invite tenders for the laying only of approximately 9,000 lineal yards of 16 in. cast-iron water main and appurtenant works. Quantities of Mr. Harold Brown, Surveyor to the Council, Town Hall, Weston-super-Mare. Deposit £5 5s.

JANUARY 6.—**Middlesex.**—ROADS.—The C.C. of Middlesex invite tenders for a widening of the Uxbridge main road from Southall Town Hall to Hayes Canal Bridge approach in the County of Middlesex. Quantities of Mr. H. T. Wakelam, County Engineer, Middlesex Guildhall, Westminster, S.W. 1. Deposit £5 5s.

JANUARY 7.—**Greenock.**—ROADS AND SEWERS.—The Corporation invite tenders for the formation of streets and the construction of sewers in connection with the housing scheme. Quantities of the Borough Surveyor, Greenock. Deposit, £1 1s.

JANUARY 7.—**Llandaff.**—SEWER.—The R.D.C. invite tenders for the construction of about 330 lineal yards of 9 in. and 18 in. earthenware and cast iron pipe sewers with manholes, &c., at Allensbank-road, Gabalfa. Quantities of the Surveyor, Mr. James Holden, A.M.Inst.C.E., Park House, 20, Park-place, Cardiff. Deposit £1.

JANUARY 9.—**Cowes.**—ROADS.—The Cowes Ferry Committee invite schemes and tenders for covering the beaches of the Cowes and East Cowes sides of the steam ferry between high and low water mark with concrete, reinforced concrete, or other suitable material in such a way as to be safe for horse traffic on a steep gradient. Particulars of the Ferry Manager, Thetis Tower, Cowes.

JANUARY 12.—**Canterbury.**—ROADS.—The Roads Committee invite tenders for the construction of granite carriage ways upon the "Gladwell" system in the following highways: New Dover-road, about 11,000 sq. yds; Longport-street, about 4,400 sq. yds. Forms of tender of Mr. Arthur C. Turley, City Surveyor, Municipal Offices, Canterbury.

JANUARY 12.—**Gellygaer.**—ROADS.—The U.D.C. invite tenders for the first section of the new road between Tinyberten and Pergram, about three-quarters of a mile in length. Quantities of Mr. F. Read, Surveyor, Council Offices, Hengoed, Glam. Deposit, £2 2s.

✱JANUARY 12.—**London, S.E.**—The Guardians of the Lewisham Union invite tenders for repairs and partial reconstruction of drains at the Workhouse, High-street Lewisham, S.E.

✱JANUARY 12.—**Loughton.**—ROADS AND SEWERS.—The L.U.D.C. invite tenders for the construction of a new road and the laying of sewers and surface water drains on the Habgood Estate, Loughton. Quantities of Mr. Horace White, F.R.I.B.A., Surveyor, High-road, Loughton, Essex. Deposit £1 1s.

JANUARY 19.—**Manchester.**—SEWERS.—The Rivers Committee invite tenders for the construction of sewers along Barnage-lane and Fog-lane. Quantities at the City Engineer's Office, Town Hall, Manchester. Deposit, £2 2s.

Auction Sales, Tenders, &c.

✱JANUARY 9.—**Sevenoaks, Kent.**—Messrs. H. Tufnell & Son, will sell by direction of the Disposal Board, huts, building material, &c., at the Royal Crown Hotel, Sevenoaks, Kent.

JANUARY 13.—**Castle Madoc.**—Messrs. Hibbard & Sons will sell by order of the Disposal Board at Castle Madoc, South Wales, stock of various kinds of timber.

JANUARY 20.—**Roehampton, S.W.**—Messrs. Green & Son will sell by direction of the disposal board, at R.A.F. Camp, Upper Richmond-road, Roehampton, S.W., huts and building materials.

JANUARY 20.—**Chelsea.**—Messrs. Knight, Frank & Rutley will sell at Chelsea, the historical and valuable site of Old Cheyne House.

Competitions.

(See Competition News, page 12.)

Public Appointments.

✱JANUARY 3.—**Depwade.**—The Depwade R.D.C. invite applications for a fully competent Clerk of the Works, in connection with the erection of 46 houses in connection with their housing scheme.

JANUARY 6.—**Birmingham.**—The Housing Committee of the City of Birmingham invite applications for Junior Surveyor and Engineer. Commencing salary £208 per year. Junior Quantity Surveyor. Salary £208 per year. Also tracer and learner, Surveying and Engineering. Commencing salary £95 per annum.

JANUARY 7.—**Chelmsford.**—The Essex County Council invite applications for the appointment of Quantity Surveyor on the staff of the Architect's Department. Salary £400 per annum.

✱JANUARY 10. — **Stafford.** — The Borough of Stafford invite applications for the appointment of a qualified Architectural Assistant in connection with the preparation of housing schemes.

JANUARY 12.—**Durham.**—The County Council of Durham invite applications for the appointment of a managing foreman painter for work in connection with the painting, colouring and renovating of Council Schools. Salary £300, rising by annual increments of £12 10s. to £350 per annum.

✱JANUARY 12.—**Reading.**—The County Borough of Reading invite applications for the post of Second Architectural Assistant.

✱JANUARY 16.—**London.**—The Metropolitan Asylums Board invite applications for the appointment of clerk in the Engineer-in-Chief's Dept. Commencing salary £150 per annum, rising £10 annually to a maximum of £200 with War Bonus at Civil Service rates (now £105 per annum).

✱NO DATE.—**Bradford.**—The City Corporation of Bradford invite applications for the post of Quantity Surveyor on the staff of the City Architect.

✱NO DATE.—**Hong Kong.**—Assistant Engineers are required by the Government of Hong Kong for the Architectural Office of the Public Works Department, for three years' service, with possible permanency.

✱NO DATE.—**Newcastle-upon-Tyne.**—The Corporation of Newcastle-upon-Tyne Housing Committee invite applications for (1) Architectural Assistant, (2) Architectural Draughtsman.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach him *not later than first post on Wednesday.*

* *Denotes accepted* † *Denotes provisionally accepted.*
‡ *Denotes recommended for acceptance.*
§ *Denotes accepted subject to modifications.*

AXMINSTER.—For the erection of twenty cottages and the widening of a road, for the U.D.C.:—

*A. N. Cole, Ltd., Plymouth	£24,427
A. Richards	£24,877
R. G. Spiller	£24,877
N. Pratt & Son	£26,061
Pitt & Son	£26,156

BELFAST.—For constructional steel work for Harbour Power Station, for the Corporation:—

*Orr, Watt & Co., Motherwell	£39,217 13 6

BIRMINGHAM.—Cottage and garage, Handsworth Wood, Birmingham. Mr. Abel Round, architect, 45, Newhall-street, Birmingham:—

*Geo. Webb & Son, Handsworth	£1,895
P. W. Cox	1,967
W. & J. Webb	1,978
W. B. and F. T. Archer	2,030
G. and H. Marshall, Smethwick	2,108
J. Harper & Sons, Blackheath	2,135
W. Jackson, Langley	2,175

BRAINTREE.—24 houses, No. 1 site, Clock House, for the Urban District Council. Mr. T. Alwyn Lloyd, Lic.R.I.B.A., architect, 32, Park-place, Cardiff. Quantities by Mr. G. W. Grey, F.S.I.:—

†The Unit Construction Co., Ltd., Braintree (for brick construction)	£21,575
A. Brown & Son, Braintree	25,888
W. H. E. Warren, Braintree	22,959
E. W. Valentine, Braintree (for 12 houses only)	11,006

CHELMSFORD.—For supply of tar macadam to the T.C. (price per ton):—

*J. Smart & Son, King's Cross—2½ in., 23s. 8d.; 1½ in. 24s. 8d.; ¾ in., 24s. 8d.; dust, 9s. 8d.	
Brook, Ltd., Westminster—2 in., 30s. 4d.; 1½ in., 31s. 4d.; ¾ in. and ½ in., 32s. 4d.	
Bristow & Co., Ltd., Westminster—2½ in., 28s. 4d.; 1½ in., 28s. 4d.; ¾ in., 29s. 4d.; dust, 19s.	
Partington, Steel & Iron Co., Manchester—2½ in. 15s.; 1½ in., 15s. 6d.; ¾ in., 16s; graded 2½ in., and ½ in., 15s.	

CHEPSTOW.—For the erection of 20 houses for the R.D.C.:—

*Drew & Sons, Chalford	£18,996

HEMSWORTH.—For the erection of 188 houses for the R.D.C.:—

*W. Horner—Brickwork	£71,895 3 4
*Messrs. Smith Brothers (Barnsley), Ltd.—Carpenter and Joiner	32,159 0 0
*Messrs. Hull & Sons—Plumber and Glazier	14,599 0 0
*Mr. A. Firth—Plasterer	6,969 10 0
*Messrs. Stubbing & Fell—Tiling	7,700 0 0
*Mr. S. Sterry—Painting	3,028 16 1
*Mr. E. Rothers—Making Roads and Sewers	8,677 7 0
*Mr. J. Lampney—Tree Planting	498 8 3

ILFORD.—For construction of ten houses at Tomswood-hill, for the U.D.C.:—

*Mr. Walter	£675 each.

LONDON.—For cleaning and repairing at Nos. 196-200, Boyson-road, Westmoreland road, S.E., for the Guardians of Southwark Union. Mr. A. Saxon Snell, F.R.I.B.A., 9, Bentinck-street, Manchester-square, W. 1:—

F. C. Cory & Sons, Douglas-street, S.E.8	£381

LONDON.—For the erection of a new police section house at Aybrook-street, Marylebone, Mr. J. Dixon Butler, F.R.I.B.A., Architect, New Scotland Yard, S.W. 1. Quantities by Messrs. Thurgood, Son & Chidgey, 18, Adam-street, Adelphi, W.C.:—

Holland & Hannen,	£23,049
F. & H. Higgs	22,952
Higgs & Hill	22,874
Godson & Sons	22,748
Mowlem & Co.	22,585
A. Monk	22,520
Wall & Co.	22,250
Adamson & Sons	21,975
A. E. Symes	21,700
Jarvis & Sons	21,368
Prestige & Co.	21 225
Patman & Fotheringham	20,841

LONDON.—In connection with the announcement in our issue of December 19 of the acceptance of a Tender for the conversion of City Mansions into Tenements for the Islington Borough Council, Mr. E. C. P. Monson, F.R.I.B.A., of Finsbury Pavement House, E.C. 2, was the architect, and Messrs. Geo. Corderoy & Co., 11, Queen Anne's-gate, S.W. 1, the quantity surveyors.

NOTTINGHAM.—For the internal cleaning and painting of the Mental Wards and Alexandra Ward, at the Infirmary, Bagthorpe, for the Guardians. Mr. E. R. Sutton, F.R.I.B.A., architect, Albion Chambers, King-street, Nottingham:—

W. H. Rushton	£548 16 9
Exors. of the late Charles Wilmot	728 10 6
Sami. Coulton	754 0 0
W. J. Sims, Son & Cooke, Ltd.	770 0 0
T. H. Harper	818 7 2
L. White	840 19 7
T. Long & Sons	866 12 6
T. Barlow & Co.	877 15 6
K. Rowell	881 5 6

(Continued on page 48.)

PRICES CURRENT OF MATERIALS.*

[Owing to the exceptional circumstances which prevail at the present time, prices of materials should be confirmed by inquiry. Since our last issue several prices have been revised.—Ed.]

BRICKS, &c.

	£ s. d.
Per 1,000 Alongside, in River Thames up to London Bridge.	
Best Stocks	4 5 0
Per 1000, Delivered at London Goods Stations.	
Fletton	2 18 0
Best Stourbridge Fire bricks	10 10 0
Best Blue Pressed Staffordshire	9 11 0
Do. Bullnose	9 13 6
Blue Wire Cuts	7 18 6
GLAZED BRICKS—	
Best White, Ivory, and Salt Glazed Stretchers	23 0 0
Headers	22 10 0
Quoins, Bullnose and 4½in. Flats	28 10 0
D'ble Str'tch'rs	30 10 0
D'ble Headers	27 10 0
One Side and two Ends	31 10 0
Two Sides and one End	32 10 0
Splays and Squints	30 0 0

Second Quality, £1 per 1,000 less than best. Cream and buff, £2 extra over white. Other colours, Hard Glaze, £5 10s. extra over white.

	s. d.	
Thames Ballast	16 6	per yard, delivered
Pit Sand	19 6	
Thames Sand	21 0	" " 2 miles
Best Washed Sand	20 0	" " radius
½in. Shingle for Ferro-Concrete	19 0	" " Paddington.
¼ in. "	20 0	" "

Per ton, delivered in London area.

	£ s. d.	
Best Portland Cement	3 13 6	.. 3 16 6

66/6 alongside at Vauxhall in 80-ton lots.
Ferrocrete per ton extra on above 5 0
Best Ground Blue Lias Lime 2 16 0 at riy. depot.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks. The sacks are charged at 2s. 6d. each and credited at 2s. each if returned in good condition within three months.

Grey Stone Lime ..... 61s. 0d. per ton delivered.
Stourbridge Fireclay in s'cks 42s. 6d. per ton at riy. dpt.

STONE.

	s. d.
BATH STONE—delivered in railway trucks at Westbourne Park, Paddington, G.W.R., or South Lambeth, G.W.R., per ft. cube	2 0
Do. do. delivered in railway trucks at Nine Elms, L. & S.W.R., per ft. cube	2 1½
Do. do. delivered on road waggons at Nine Elms Depot	2 2½
PORTLAND STONE—	
Brown Whitbed, in random blocks of 20 ft. average, delivered in railway trucks at Nine Elms, L. & S.W.R., South Lambeth Station, G.W.R., and Mileage Station G.W.R., per ft. cube	3 6½
Do. do. delivered on road waggons at above stations, per ft. cube	3 7½

White basebed, 3d. per ft. cube extra.

NOTE.—½d. ft. cube extra for every foot over 20 ft. average.

YORK STONE, BLUE—*Robin Hood Quality.* Delivered at any Goods Station London.	s. d.
Scappled random blocks ..... Per Ft. Cube	7 0
6 in. sawn two sides landings to sizes (under 30 ft. super.) ..... Per Ft. Super	5 6
6 in. rubbed two sides, ditto ..... "	6 2
3 in. sawn two sides slabs (random sizes) "	2 5
2 in. to 2½ in. sawn one side slabs (random sizes) ..... "	1 5½
1½ in. to 2 in. ditto, ditto ..... "	1 3
HARD YORK— Delivered at any Goods Station London.	
Scappled random blocks ..... Per Ft. Cube	6 0
6 in. sawn two sides landing to sizes (under 40ft. super.) ..... Per Ft. Super	5 0
6 in. rubbed two sides ditto ..... "	6 0
4 in. sawn two sides slabs (random sizes) "	2 10½
3 in. ditto, ditto "	2 2
2 in. self-faced random flags .. Per Yard Super	6 10

WOOD.

(The following prices are the Controller's prices fixed Feb. 7, 1919. The control is now removed.)

Pursuant to paragraph 3 of the Timber Control Order, 1918, the Controller of Timber Supplies hereby gives notice that until further notice the following shall be the maximum prices at which imported timber may be sold. These prices are per standard landed and in store.

WHITE SEA REDWOOD.

Inches	1st £ s.	2nd £ s.	3rd and unsorted £ s.	4th £ s.
4 × 11	54 10	52 10	49 10	47 10
4 × 9	50 10	48 10	45 10	43 10
4 × 8	47 10	45 10	42 10	40 10
4 × 7	47 10	45 10	42 10	40 10
3 × 8	46 10	44 10	41 10	39 10
3 × 7	46 0	44 0	41 0	39 0
3 × 6	45 10	43 10	40 10	38 10
3 × 5	45 10	43 10	39 10	37 10
2½ to 3 × 11	53 10	51 10	48 10	46 10
2½ to 3 × 9	48 0	46 0	43 0	41 0
2½ × 7 to 8	46 0	44 0	41 0	39 0
2½ × 6	45 10	43 10	40 10	38 10
2½ × 5	45 10	43 10	39 10	37 10
2 × 11	53 10	51 10	48 10	46 10
2 × 9	48 0	46 0	43 0	41 0
2 × 8	46 10	44 10	41 10	39 10
2 × 7	46 0	44 0	41 0	39 0
2 × 6	45 10	43 10	40 10	38 10
2 × 5	44 10	42 10	39 10	37 10
2 × 4	44 10	42 10	40 0	38 0

UNSORTED LARCHWOOD at 3rd Archangel Redwood Prices.

Boards, 1st and 2nd, £1 10s. extra.
Boards, 3rd and 4th, £1 extra.

FEATHER EDGED BOARDS, £40 10s. per std.
SAWN LATHS, 3s. per bundle.

U/S SLATING BATTENS (yellow and white and stripe), £36.

WOOD (*Continued*).

SWEDISH AND NORWEGIAN FLOORING AND MATCHING.

U/S Red and White.

Per 100ft. super.	Per 100 ft. super
1¼in. P.E. at 60/-	¾in. P.E. at 30/-
1¼in. P.B. at 50/-	¾in. P.E. at 25/6
1in. P.E. at 40/-	¾in. P.E. at 20/6
¼in. P.E. at 35/-	

T. & G. and Match Lining at 6d. per square extra.

PLANED BOARDS—11 in., £45 per standard; 10 in., £43 per standard; 9 in., £43 per standard; 8 in., £41 per standard.

YELLOW PINE.

Inches	1st £ s.	2nd £ s.	3rd £ s.	4th £ s.
3 × 12 and up	67 0	55 0	50 10	44 0
3 × 11	64 0	53 0	48 10	44 0
3 × 10	58 0	48 0	44 0	42 0
3 × 9	57 0	47 0	43 0	41 0
3 × 8	55 0	45 0	42 0	39 0
3 × 7	55 0	45 0	42 0	39 0
3 × 6 and down	52 0	42 0	40 0	37 0

For complete specification and controlled prices, see "London Gazette," February 7, 1919.

Dry Wainscot Oak, per ft. super, as inch	0	2	6	to	0	3	0
¼ in. do. do.	0	2	0	to	0	2	6
Dry Mahogany—Honduras, Tabasco, African, per ft. super, as inch	0	2	6	to	0	3	0
Cuba. Mahogany	0	3	6	to	0	4	0
Teak (Rangoon, Moulmein or Java), per load	60	0	0	to	85	0	0
American Whitewood planks, per ft. cube	0	18	0	to	1	0	0
Scotch Glue, per cwt.	5	5	0	..		—	
Liquid Glue, per gallon	0	17	0	..		—	

SLATES.

1st quality slates from Bangor or Portmadoc in truck load delivered London area. Per 1,000 of 1,200.

		£ s. d.
Best Blue Bangor Slates,	24 by 12	48 10 0
" " "	22 by 12	35 0 0
First quality "	22 by 11	32 5 0
" " "	20 by 12	32 0 0
Best Blue Portmadoc	20 by 10	27 10 0
" "	18 by 10	22 0 0
First quality "	18 by 9	18 0 0
" "	16 by 10	17 0 0
" "	16 by 8	13 5 0

TILES.

	Per f.o.r.	1,000 London.
	£	s. d.
Best machine-made tiles from Broseley or Staffordshire district	6	2 6
Ditto hand-made ditto	6	7 6
Ornamental ditto	6	10 0
Hip and valley tiles (per dozen)	0	14 0

METALS.

	s. d.
JOISTS, GIRDERS, &c., TO LONDON STATION PER TON—	
R. S. Joists, cut and fitted	28 0 0
Plain Compound Girders	30 0 0
Stancheons	32 0 0
In Roof Work	36 0 0

WROUGHT-IRON TUBES AND FITTINGS—
(Discount off List for lot of not less than £10 net value delivered direct from works. 5 per cent. less carriage forward if sent from London stocks.)

	Sizes up to and including 2 in. Tubes.	Fittings.	Sizes 2½ in. to 6 in. Tubes.	Fittings.
Gas	26½	32½	31½	37½
Water	18½	28½	26½	35
Steam	11½	25	21½	32½
Galvanised Gas	7½	25	12½	30
" Water	+ 2½	−21½	−50	−27½
" Steam	+ 12½	−17½	+2½	−25

L.C.C. COATED SOIL PIPES—London Prices ex works.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6 fts.	4 7	3 4	4 0
2½ in. "	5 6	3 8	5 0
3 in. "	6 9	4 0	6 0
3½ in. "	7 6	5 0	7 0
4 in. "	7 11	5 8	8 0

RAIN-WATER PIPES, &c.

	Pipe. s. d.	Bends, stock angles. s. d.	Branches, stock angles. s. d.
2 in. per yd. in 6fts. plain	3 4	1 10	2 6
2½ in. " "	3 9	2 2	3 0
3 in. " "	4 6½	2 8	4 0
3½ in. " "	5 4	3 2	4 8
4 in. " "	5 7½	3 10	5 6

L.C.C. DRAIN PIPES,—9 ft. lengths. London Prices. 4 in., 10s. .. 5 in.. 12s 6d. ... 6 in., 15s.

	Per ton in London. £ s. d.		£ s. d.
IRON—			
Common Bars	26 10 0	to	27 10 0
Staffordshire Crown Bars good merchant quality	27 0 0	..	27 10 0
Staffordshire "Marked Bars"	28 0 0	..	29 0 0
Mild Steel Bars	23 10 0	..	24 10 0
Steel Bars, Ferro-Concrete quality, basis price	23 0 0	..	24 0 0
Hoop Iron, basis price	29 0 0	..	30 0 0
" " Galvanised	40 0 0	..	—
Sheet Iron Black—			
Ordinary sizes to 20 g.	27 10 0	..	28 10 0
" " 24 g.	28 10 0	..	29 10 0
" " 26 g.	30 0 0	..	31 0 0
Sheet iron, Galvanised flat, ordinary quality—			
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	37 10 0	..	—
Ordinary sizes to 22 g. and 24 g.	37 10 0	..	38 0 0
Ordinary sizes to 26 g.	38 10 0	..	39 10 0

METALS (*Continued*).

	Per ton in London. £ s. d.		£ s. d.
Sheet Iron, Galvanised, flat, best quality—			
Ordinary sizes to 20 g.	39 0 0	..	—
" " 22 g. and 24 g.	39 10 0	..	—
Ordinary sizes to 26 g.	42 10 0	..	—
Galvanised Corrugated Sheets—			
Ordinary sizes, 6 ft. to 6 ft. 20 g.	37 10 0	..	—
Ordinary sizes, 22 g. and 24 g.	38 0 0	..	—
Ordinary sizes, 26 g.	39 10 0	..	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. to 20 g. and thicker	30 0 0	..	—
Best Soft Steel Sheets, 20 g. and 24 g.	30 10 0	..	—
Best Soft Steel Sheets, 26 g.	32 0 0	..	—
Cut Nails, 3 in. to 6 in.	32 0 0	..	38 0 0

(Under 3 in. usual trade extras.)

LEAD, &c.

	Delivered in London. £ s. d.		£ s. d.
LEAD Sheet, English, 4 lb. and up	56 0 0	..	—
Pipe in coils	56 10 0	..	—
Soil Pipe	59 0 0	..	—
Compo pipe	59 10 0	..	—

NOTE—Country delivery, 2/6s. per ton extra; lots under 5 cwt., 1s. 6d. per cwt. extra. Cut to sizes, 1s. cwt. extra.

Old lead, ex London area, at Mills ..... per ton	36 10 0	..	—
Do., ex country, carriage forward ..... per ton	37 10 0	..	—
COPPER—			
Strong Sheet .... per lb.	0 2 3	..	—
Thin " .... "	0 2 4	..	—
Copper nails .... "	0 2 3	..	—
Copper wire .... "	0 2 4	..	—
TIN—English Ingots "	0 3 3	..	—
SOLDER—Plumbers' "	0 1 3	..	—
Tinmen's "	0 1 5	..	—
Blowpipe "	0 1 3	..	—

GLASS.

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES AND IN SQUARES IN ORDINARY SIZES.

	Per Ft.		Per Ft.
15 oz. fourths	7½d.	32 oz. fourths	10½d.
" thirds	8d.	" thirds	11½d.
21 " fourths	8½d.	Fluted, Obscured and	
" thirds	8½d.	Enamelled Sheet,	
26 " fourths	9½d.	15 oz.	7½d.
" thirds	10½d.	21 "	8½d.

Extra price according to size and substance for squares cut from stock.

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

	Per Ft.
Rolled plate	4½d.
Rough rolled and rough cast plate	5½d.
Rough rolled and rough cast plate	5½d.
Figured Rolled, Oxford Rolled, Baltic, Oceanic Arctic, Stippolyte, and small and large Flemish white	6½d.
Ditto, tinted	8½d.
Rolled Sheet	6d.
White Rolled Cathedral	6d.
Tinted do.	8d.

PAINTS, &c.

		£ s. d.
Raw Linseed Oil in pipes ..... per gallon		0 10 6
" " " in barrels .... "		0 10 9
" " " in drums .... "		0 10 11
Boiled " " in barrels .... "		0 10 3
" " " in drums .... "		0 10 5
Turpentine in barrels ..... "		0 12 6
" in drums (10 gall.) .. "		0 13 9
Genuine Ground English White Lead, per ton (In not less than 5 cwt. casks.)		91 0 0
GENUINE WHITE LEAD PAINT— "Nine Elms," "Park," "Supremus," and other best brands (in 14 lb. tins) not less than 5 cwt. lots .. per ton delivered		111 0 0
Red Lead, Dry (packages extra) .. per ton		65 0 0
Best Linseed Oil Putty ..... per cwt.		1 11 3
Fllocul ..... per cwt.		0 16 6
Size. X D Quality ..... fkn.		0 6 0

VARNISHES, &c.

	Per gallon. £ s. d.
Oak Varnish ..... Outside	0 18 0
Fine ditto ..... ditto	1 0 0
Fine Copal ..... ditto	1 1 6
Pale Copal ..... ditto	1 2 6
Pale Copal Carriage ..... ditto	1 4 6
Best ditto ..... ditto	1 14 6
Floor Varnish ..... Inside	0 19 0
Fine Pale Paper ..... ditto	0 16 0
Fine Copal Cabinet ..... ditto	1 2 6
Fine Copal flatting ..... ditto	1 0 6
Hard drying Oak ..... ditto	0 18 0
Fine Hard drying Oak ..... ditto	0 19 0
Fine Copal Varnish ..... ditto	1 0 6
Pale ditto ..... ditto	1 2 6
Best ditto ..... ditto	1 14 6
Best Japan Gold Size	0 19 0
Best Black Japan	1 2 0
Oak and Mahogany Stain	1 1 0
Brunswick Black	0 14 0
Berlin Black	0 19 0
Knotting	1 11 0
French and Brush Polish	1 2 0
Liquid Dryers in Terebine	0 17 0
Cuirass Black Enamel	0 7 0

* The information given on this page has been specially compiled for THE BUILDER and is copyright. Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the highest or lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

TENDERS—*continued from page 46.*

NUNEATON.—For the construction of about 2,450 yards of 6 in., 9 in., and 12 in. earthenware pipe sewers, and for the formation and pitching of about 1,700 yards of carriageways and footpaths and various works, for the T.C. Mr. R. C. Moon, Borough Engineer, Nuneaton :—

*G. Percy Trentham, Ltd. Birmingham	£7,616	0	0
A. Salmon, Rugby	23,299	9	0
H. C. Pullar & Co., Manchester	11,250	1	10
Currall, Lewis & Martin, Ltd., Birmingham	11,074	4	7
Crauford Bros., Largs, Ayrshire	9,245	11	10
Wm. Muirhead, Macdonald Wilson & Co., Birmingham	9,239	1	10
G. Cooper, Nuneaton	8,475	9	3
Johnson & Langley, Leicester	8,462	1	4
C. L. Tomlinson, South Normanton	8,400	0	0

POOLE.—For the erection of 100 houses in reinforced concrete, for the T.C. :—

*Hill, Richards & Co. : £671 per house, plus 10 per cent.

PRESTON.—For alterations to lecture room of Park School, for the Corporation :—

*North of England Furnishing Co., Darlington £328 3 6

SOUTH MIMMS.—For the erection of stables and cart sheds at Potter's Bar, for the South Mimms R.D.C. Mr. Geo. Simcox, Engineer and Surveyor, South Mimms R.D.C. :—

†W. Slough, Barnet	£1,375
S. Worboys, Potter's Bar	1,597
Blow & Peters, St. Albans	2,742

VAUXHALL.—We regret that through a printer's error, the list of tenders for alteration and additions to 50, Nine Elms-lane, for Messrs. Jackson's Millboard and Paper Co., Ltd., was incorrectly given. Messrs. Briant & Son were the surveyors for the work. The correct list is :—

*Rice & Son	£5,074
Wm. Mills & Sons	7,189
John Marsland & Sons	5,877
F. Wetzer & Son	5,138

WALTHAMSTOW.—For painting, varnishing and distempering, &c., the interior of the boys' and girls' departments, Selwyn-avenue Schools, Highams-park, for the Education Committee. Mr. H. Prosser, M.S.A., architect to the Committee :—

*E. Fuller & Son, Walthamstow	£375	0	
D. W. Lucas, Walthamstow	800	0	
J. Sands, Walthamstow	464	0	
S. Blow, Ltd., Tower-hill	440	10	
A. J. Wick, Walthamstow	438	0	
J. & J. Dean, Walthamstow	427	0	
F. E. McBride, Walthamstow	417	10	
A. G. Barton, Walthamstow	377	0	

BARKING.—For the erection of houses on the Eastbury Housing Scheme—First portion 106 houses—for the Urban District Council. Mr. C. J. Dawson, P.R.I.B.A., Architect, Clock House Chambers, Barking. Messrs. Gardiner & Theobald, Quantity Surveyors, 96, Gower-street, W.C.

Contract	No. 1 (28 Houses).	No. 2 (38 Houses).	No. 3 (40 Houses).	Contract No. 4 House Drainage Duplicate system (106 Houses).	Contract No. 5 Fencing (106 Houses).	Total (106 Houses).
	Per House. £	Per House. £	Per House. £	Per House. £	Per House. £	Per Ho. £
S. E. Moss, Southend	1,012	974*	980*	30	21	1,037
‡Arding & Hobbs, London	997	952	960	46	37	1,049
Surveyor to the Council	1,023	1,010	1,020	33*	23*	1,073
E. H. Glenny, Barking	1,128	1,107	1,110	42	28	1,127
R. Morton Hughes, London	1,144	1,106	1,114	45	41	1,206
Rowley Bros., Wood Green	1,168	1,133	1,143	44	33	1,222
H. G. Horswill, Forest Gate	1,191	1,166	1,173	42	28	1,246
J. N. Legget, Ilford	964*	–	–	–	–	–
Durston & Rogers, Brentwood	1,049	–	–	–	–	–
S. & G. Robinson, Ltd., London	1,203	–	–	–	–	–
Hill & Gurr, Bromley	1,392	–	–	54	29	–
Garden Cities Housing Co.	1,149	1,118	–	37	31	–
G. & J. W. Fox, Ilford	–	1,212	–	–	–	–
C. Manning, Manor Park	–	1,222	–	–	–	–
†Central Building Co., Barking	–	–	–	35	29	–
*Myall Bros., Southend	–	–	–	–	–	–

* Accepted subject to certain omissions and variations.
‡ Tender withdrawn. ' Part only tendered for ditto.

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WALTHAMSTOW.—For painting, varnishing and distempering, &c., the interior of the Edinburgh-road Junior Mixed School, for the Education Committee. Mr. H. Prosser, M.S.A., architect to the Committee :

*J. Sands, Walthamstow	£206	10	
D. W. Lucas, Walthamstow	438	0	
S. Blow, Ltd., Tower-hill	295	0	
E. Fuller & Son, Walthamstow	246	0	
E. E. McBride, Walthamstow	237	0	
J. & J. Dean, Walthamstow	225	0	
A. G. Barton, Walthamstow	223	0	
A. J. Wick, Walthamstow	215	0	

WALTHAMSTOW. — For painting, varnishing and distempering, &c., the interior of the Queen's-road Schools (all departments), for the Education Committee. Mr. H. Prosser, M.S.A., architect to the Committee :—

*J. & J. Dean, Walthamstow	£685	0	
D. W. Lucas, Walthamstow	864	0	
S. Blow, Ltd., Tower-hill	845	10	
F. E. McBride, Walthamstow	839	7	
A. G. Barton, Walthamstow	743	0	
E. Fuller & Son, Walthamstow	710	0	
A. J. Wick, Walthamstow	700	0	

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